



# **ETON America**

## **40cc Service Manual**

**Covering:**  
**Rascal IXL-40**  
**Viper Jr. RXL-40**  
**Viper 40E RXL-40E**



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# 1. INFORMATION

## 1.1 SAFETY

- Gasoline is extremely flammable and is explosive under certain conditions.
- Do not smoke or allow sparks or flames in your work area.
- Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.
- The battery electrolyte contains sulfuric acid. Protect your eyes, skin, and clothing. In case of contact, flush thoroughly with water. Seek medical attention if electrolyte gets in the eyes.

## 1.2 NOTES

**All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing.**

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## 1.3 SPECIFICATIONS

### ENGINE

Type	Air-Cooled 2-Stroke
Displacement	41.5 cc
Bore and Stroke	40.0*33mm
Compression	6.6:1
Maximum Torque	2.5 N-m@5000rpm
Maximum Horsepower	2.2 Ps @7000rpm
Carburetor	Mikuni VM16
Ignition	Capacitor Discharge
Starting	Hand Pull (Recoil) starter
Lubrication	Oil/Fuel Premix
Air cleaner	Dry Type
Transmission	Single-speed automatic clutch

### CHASSIS

Overall Length	1160mm(45.7inch)
Overall Width	650mm(25.6inch)
Overall Height	727mm(28.6inch)
Seat Height	540mm(21.3inch)
Wheel base	728mm(28.7inch)
Ground Clearance	75mm(3.0inch)
Dry Weight	60kg
Fuel Tank Capacity	3.5liter

### SUSPENSION

Front	Two absorber and A-arm
Rear	One absorber and Swing arm

### BRAKES

Front	None
Rear	Drum

### TIRES

Front	145-70/6
Rear	145-70/6

### COLOR

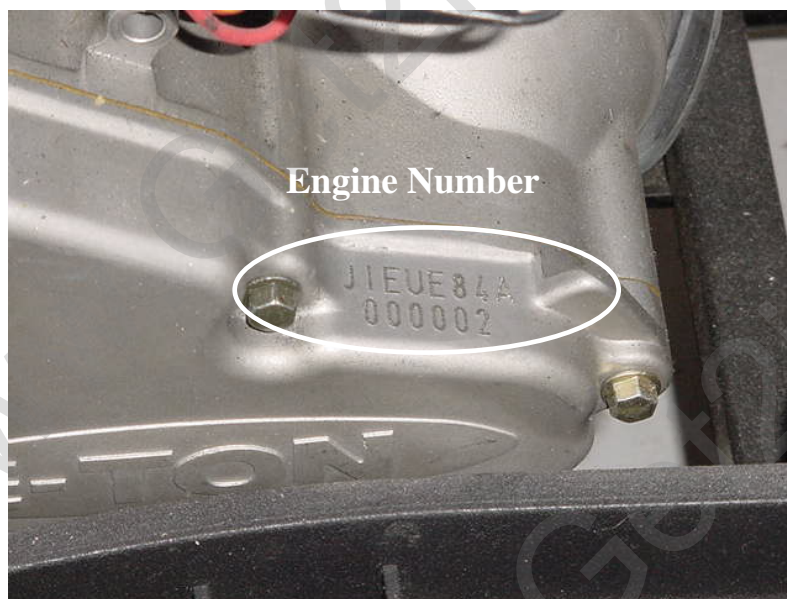
Color	Red / Blue
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\*Specifications subject to change without notice.

## 1.4 SERIAL NUMBER

The Vehicle Identification Number (VIN) is stamped on a plate attached to the front of the frame.

The Engine serial number is stamped on the left side of the crankcase.



## 1.5 TORQUE VALUES

### ENGINE

Item	Qty	Thread dia.(mm)	Torque : N-m / (ft-lbs)
Spark plug	1	14 mm	12-19 / (9-14)
Intake pipe mounting bolt	2	5 mm	3.5-5 / (2.5 – 4)
Cylinder socket bolt	4	5 mm	4.5-6 (3-4.5)
L Case bolt	4	5 mm	4.5-6 (3-4.5)
AC generator assembly nut	1	8 mm	18-20 (13-15)
Clutch weight bolt	2	8 mm	18-20 (13-15)
Clutch flange nut	1	10 mm	35-45 (26-33)
R. Case cover bolt	4	6 mm	10-14 (7-10)
Mission case socket bolt	4	6 mm	10-14 (7-10)
Gearbox cover socket bolt	5	6 mm	10-14 (7-10)
Gearbox cover drain bolt	1	8 mm	20-30 (15-22)
Oil drain bolt	1	8 mm	20-30 (15-22)
Cam sprocket bolt	2	6 mm	10-14 (7-10)
L Case bolt	4	6 mm	10-14 (7-10)

### FRAME

Item	Qty	Thread dia.(mm)	Torque: N – m / (ft-lbs)
Handlebar upper holder bolt	4	6 mm	10-14 / (7-10)
Steering shaft nut	1	14 mm	50-60 / (37-44)
Steering shaft bushing holder nut	2	8 mm	24-30 / (17-22)
Tie rod lock nut	4	10 mm	35-43 (25-32)
King pin nut	2	10 mm	30-40 / (22-30)
Front axle nut	2	12 mm	55-65 / (41-48)
Rear brake arm nut	1	6 mm	7-12 / (5-9)
Rear axle nut	2	14 mm	60-80 / (44-59)
Exhaust muffler mounting bolt	1	8 mm	30-35 / (22-25)
Engine hanger bolt nut	3	8 mm	30-35 / (22-25)

### STANDARD TORQUE VALUES

Item	Torque N-m / (ft-lbs)	Item	Torque N-m / (ft-lbs)
5mm bolt nut	4.5-6 / (3-4.5)	5mm screw	3.5-5 / (2.5-4)
6mm bolt nut	8-12 / (6-9)	6mm screw, 6mm flange bolt with 8mm head	7-11 / (5-8)
8 mm bolt nut	18-25 / (13-18)	6mm flange bolt nut	10-14 / (7-10)
10 mm bolt nut	30-40 / (22-30)	8mm flange bolt nut	24-30 / (17-22)
12 mm bolt nut	50-60 / (37-44)	10mm flange bolt nut	35-45 / (25-33)



## 2. MAINTENANCE

- 2.1 MAINTENANCE DATA
- 2.2 MAINTENANCE SCHEDULE
- 2.3 FUEL TUBE
- 2.4 THROTTLE OPERATION
- 2.5 THROTTLE CABLE ADJUSTMENT
- 2.6 AIR CLEANER
- 2.7 SPARK PLUG
- 2.8 IDLE SPEED
- 2.9 DRIVE CHAIN
- 2.10 BRAKE SYSTEM
- 2.11 WHEELS AND TIRES
- 2.12 STEERING SYSTEM
- 2.13 TOE-IN
- 2.14 GEAR OIL

### 2.1 MAINTENANCE DATA

#### SPECIFICATIONS

SPARK PLUG GAP:	0.6-0.7 mm
RECOMMENDED SPARK PLUGS:	DR8ES-L (NGK)
THROTTLE LEVER FREE PLAY:	5-10 mm
IDLE SPEED:	1700±100 rpm
BRAKE LEVER FREE PLAY:	15-25 mm
DRIVE CHAIN SLACK	10-25 mm
FRONT/REAR TIRE PRESSURE	2.2± 0.3 psi(0.15 kgf/cm <sup>2</sup> )
TOE-IN	5±10 mm

# MAINTENANCE

## 2.2 MAINTENANCE SCHEDULE

The maintenance intervals in the follow table are based upon average riding conditions. Riding in unusually dusty areas requires more frequent servicing.

	INITIAL SERVICE (First week)	REGULAR SERVICE (Every 30 operating days)	EVERY YEAR	
FUEL LINE			I	
THROTTLE OPERATION	I	I		
AIR CLEANER		C		
SPARK PLUG		I		
CARBURETOR IDLE SPEED	I	I		
DRIVE CHAIN	I,L	I,L		
BRAKE SHOE WEAR			I	
BRAKE SYSTEM	I	I		
NUT, BOLT, FASTENER	I	I		
WHEEL	I	I		
STEERING SYSTEM				
SUSPENSION SYSTEM			I	
GEAR OIL			I	
			R	

Note - **I:** Inspect and Clean, Adjust, Lubricate or Replace, if necessary

**C:** Clean

**L:** Lubricate

**R:** Replace

## 2.3 FUEL LINES

Inspect the fuel lines for deterioration, damage, or leakage and replace if necessary.



## 2.4 THROTTLE OPERATION

Inspect for smooth throttle lever full opening and automatic full closing in all steering positions. Inspect for deterioration, damage, or kinking in the throttle cable. If any, replace it.

Check the throttle lever. Free play is 5-10 mm at the tip of the throttle lever.

Disconnect the throttle cable at the upper end. Lubricate the cable with commercially lubricant to prevent premature wear.



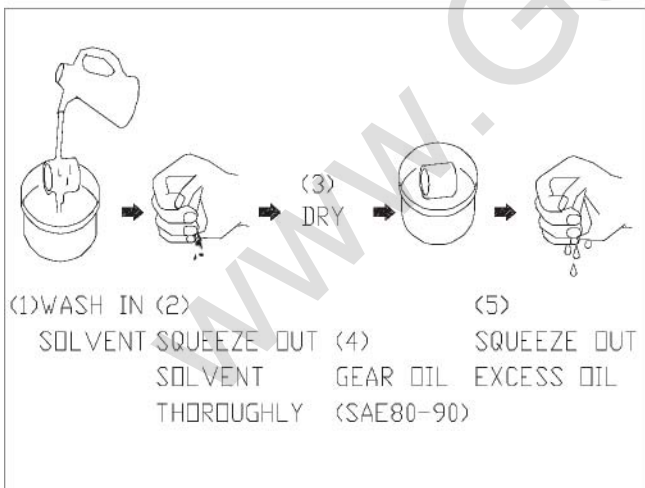
## 2.5 THROTTLE CABLE ADJUSTMENT

Slide the rubber cap of the adjuster off the throttle housing, loosen the lock nut, and adjust the free play of the throttle lever by turning the adjuster on the throttle housing. Inspect the free play of the throttle lever.



## 2.6 AIR CLEANER

- (1) Loosen the screws and remove the air cleaner from carburetor.
- (2) Disassemble the air cleaner cover and body.
- (3) Remove the air cleaner element and screen.
- (4) Wash the element in non-flammable or high flash point solvent, squeeze out the solvent thoroughly, and allow to dry completely.
- (5) Soak the element in gear oil (SAE 80-90) and squeeze out the excess oil.
- (6) Install the air cleaner element and screen in the body.
- (7) Assemble the air cleaner body and cover.



## 2.7 SPARK PLUG

- (1) Disconnect the spark plug cap and remove the spark plug.
- (2) Visually inspect the spark plug electrodes for wear.
- (3) The center electrode should have square edges and the side electrode should have a constant thickness.
- (4) Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.
- (5) Measure the gap with a wire-type feeler gauge and adjust if necessary by carefully bending the side electrode.

**SPARK PLUG GAP: 0.2-0.6 mm**

**REQUIRED REPLACEMENT PLUG:**

**BPM7A (NGK) or**

**BPM6Y (NGK)**

- (6) Check the sealing washer and replace with a new one if damaged.

- (7) With the sealing washer attached thread the spark plug in by hand to prevent cross threading. Tighten the spark plug.

**TORQUE: 12-19 N-m**



## 2.8 IDLE SPEED

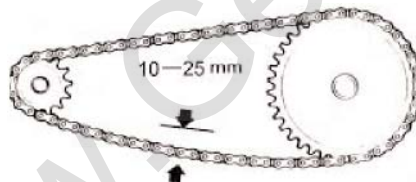
- (1) Inspect and adjust the idle speed after all other engine maintenance has been performed and is within specifications. The engine must be warm for accurate idle speed inspection and adjustment.
- (2) Warm up the engine for about five minutes and connect a tachometer.
- (3) Turn the throttle stop screw as required to obtain the specified idle speed.

**IDLE SPEED: 1700 ± 100 rpm**



## 2.9 DRIVE CHAIN

Inspect the chain slack. The standard is 10-25mm.





# MAINTENANCE

Remove the chain protection cover.

Adjust the chain slack.

Loosen the lock bolts (4), and then adjust the drive chain slack by turning the adjusting nut.

Tighten the four lock bolts.



When the drive chain becomes very dirty, it should be removed, cleaned, and lubricated with a specified lubricator. Use commercial chain lubricant to lubricate the drive chain. Clean the drive chain with kerosene and wipe it dry. Inspect the drive chain for possible wear or damage. Replace the chain if it is worn excessively or damaged.



Inspect the sprocket teeth. If it shows signs of excessive wear or damage, replace.



## 2.10 BRAKE SYSTEM

Inspect the rear brake lever and cable for excessive play or damage.

Replace or repair if necessary.

Measure the free play of the rear brake lever at the end of the lever. The standard is **15-25 mm**.



# MAINTENANCE

Adjust the free play of the rear brake lever by turning the adjuster on the rear axle.



## 2.11 WHEELS AND TIRES

Inspect the tire surfaces for cuts, nails, or other sharp objects. Check the tire surfaces at cold tire conditions. The standard tire pressure is  $2.2 \pm 0.4$  psi. (0.15 kgf/cm<sup>2</sup>)



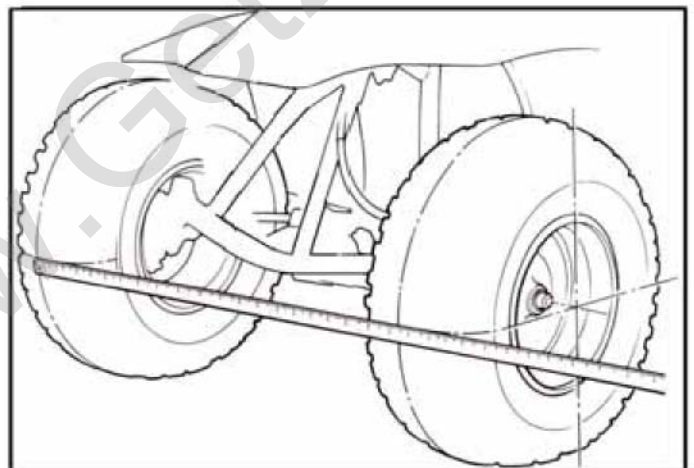
## 2.12 STEERING SYSTEM

Check the free play of the steering shaft with the front wheels pointed straight ahead. If there is excessive play, inspect the tie-rod, kingpin bushing, and ball joint.



## 2.13 TOE-IN

Park the vehicle on level ground with the front wheels facing straight ahead. Mark the centers of the tires to indicate the axle center height. Measure the distance between the marks.



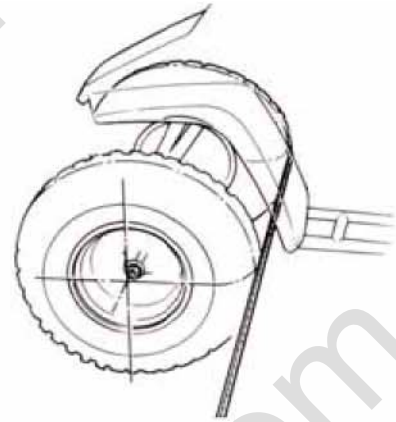
## MAINTENANCE

Carefully moving the vehicle back, let the wheels turn 180° so the marks on the tires are aligned with the axle center height.

Measure the distance between the marks.

Calculate the difference in the front and rear measurements.

**Toe-in:  $5 \pm 10 \text{ mm}$**



If the toe-in is out of standard, adjust it by changing the length of the tie-rods equally by turning the tie-rod while holding the ball joint.

Tighten the lock nuts.

**Torque: 35-43 N/m**



### 2.14 GEAR OIL

Gear oil needs to be changed every year.

There is a gear oil Drain Plug at the right side of engine.

Remove the Oil Drain Plug Bolt and to drain dirty oil



Oil release bolt

The oil filling hole is on the engine case beside gear box. Refill the case with 70cc / 2.4 oz of SAE 80/90 weight gear oil.



Oil filling hole



## 3. ENGINE REMOVAL AND INSTALLATION

### 3.1 ENGINE REMOVAL

Remove the seat and the Body Cover. (chapter 10)

Remove the spark plug cap from the spark plug.  
Remove the exhaust pipe.

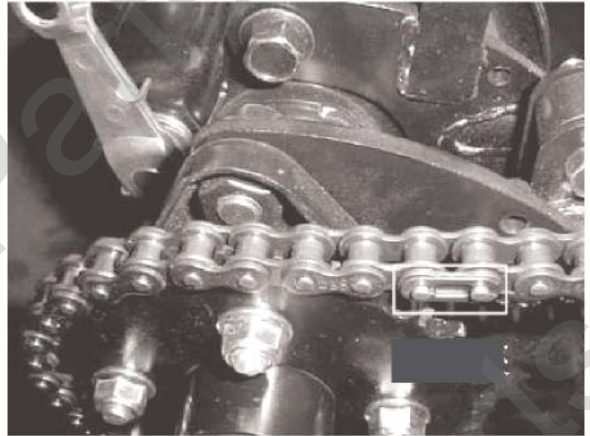
Remove the air cleaner and carburetor Remove the throttle cable and fuel lines.

Disconnect the wire connectors and remove the wire from the frame clamps.



Remove the chain protection cover.

Remove the drive chain retaining clip and master link, and remove the drive chain.



Remove the lower engine hanger nuts and the lower mission case hanger bolt at the right side.

Remove the engine from the left side.



### 3.2 ENGINE INSTALLATION

Engine installation is essentially the reverse order of removal. The torque of engine hanger bolt is 24-30 Nm  
Route the wires and cable in reverse order properly.



## 4. ENGINE FUEL SYSTEM

### 4.1 TROUBLESHOOTING

#### Engine will not start

- No fuel in tank
- No fuel to cylinder
- Too much fuel into cylinder
- No spark at plug
- Air cleaner clogged
- Improper adjustment of the idle speed screw

#### Engine idles roughly, stalls, or runs poorly

- Ignition malfunction
- Fuel/air mixture ratio no good
- Air cleaner dirty
- Insulator leaks
- Fuel tank cap breathing hole clogged

#### Lean mixture

- Carburetor fuel jet clogged
- Fuel tank cap breathing hole clogged
- Fuel filter clogged
- Fuel flows restricted
- Float level in carburetor too low

#### Rich mixture

- Float needle valve in carburetor faulty
- Float level too high
- Air duct in carburetor is clogged
- Air cleaner dirty

# ENGINE FUEL SYSTEM

## 4.2 FUEL TANK

### REMOVAL

Remove the fuel tank cap.

Remove the seat and Body Cover. Disconnect the fuel line from the carburetor. Unscrew the fuel tank mounting bolts.

Note: Keep gasoline away from flames or sparks.  
Wipe up spilled gasoline immediately.



## 4.3 THROTTLE VALVE DISASSEMBLY

Remove the throttle top from the carburetor.

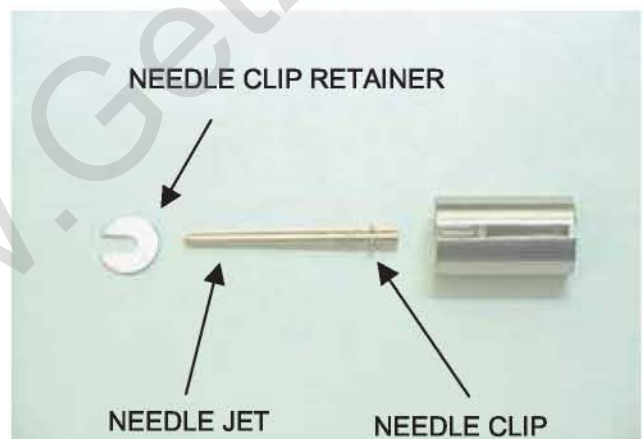
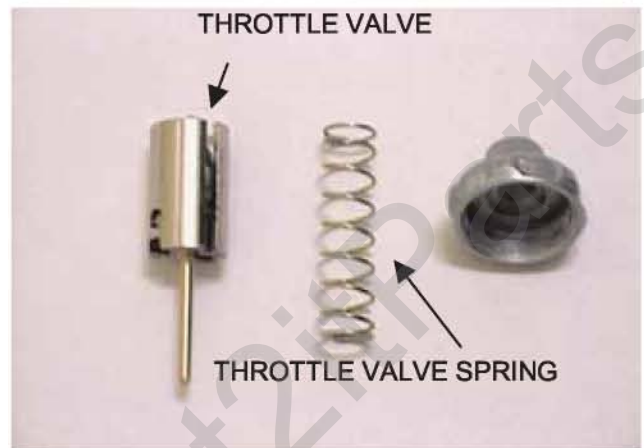


## 4.4 CAUTION

The carburetor top is an integral part of the throttle cable assembly. The carburetor top cannot be separated from the assembly without causing damage to the cable.

Never kink or twist control cables. They will not operate smoothly and may stick if they are kinked or twisted.  
Remove the throttle cable from the throttle valve while depressing the throttle valve spring.

Remove the needle clip retainer.  
Remove the needle jet and needle clip.  
Inspect the throttle valve and needle jet surface for dirt, scratches, or wear, and replace if necessary.



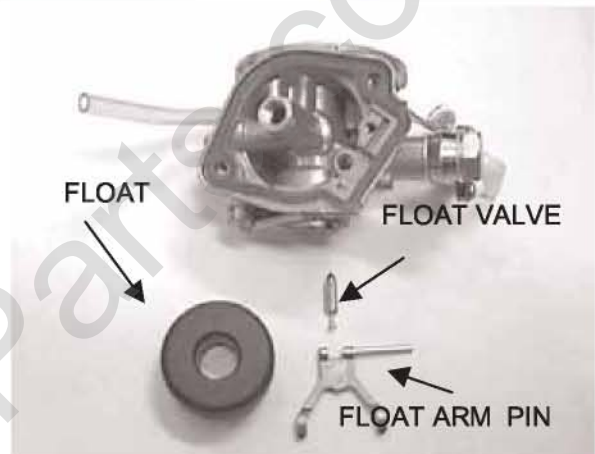
## ENGINE FUEL SYSTEM

### 4.5 CARBURETOR REMOVAL

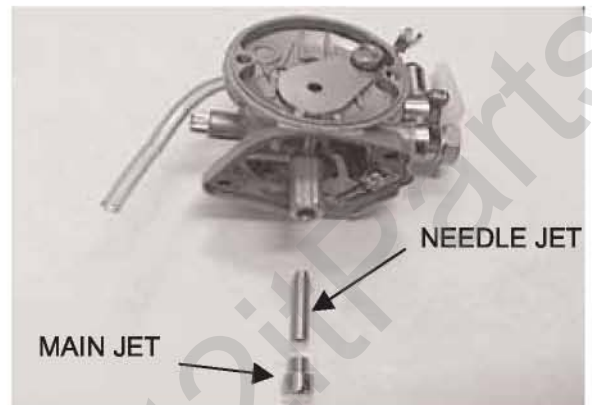
Loosen the drain screw and drain the gasoline. Remove the float chamber by removing the two retaining screws.



Remove the float arm pin.  
Remove the float and float valve.  
Inspect the float valve for wear or damage.



Remove the main jet and needle jet.  
Blow open all jets and body openings with compressed air.  
Inspect the needle jet and main jet.  
Check each part for wear or damage.  
Clean the passages and jets with compressed air.



### 4.6 FLOATS, FLOAT VALVE, AND JETS ASSEMBLY

#### **NOTE:**

Handle all jets and needles with care. They can be easily scored or scratched.  
Install the needle jet, main jet, and throttle stop screw.  
Install the float valve, float, and float arm pin. Install the float chamber.



# ENGINE FUEL SYSTEM

## 4.7 THROTTLE VALVE ASSEMBLY

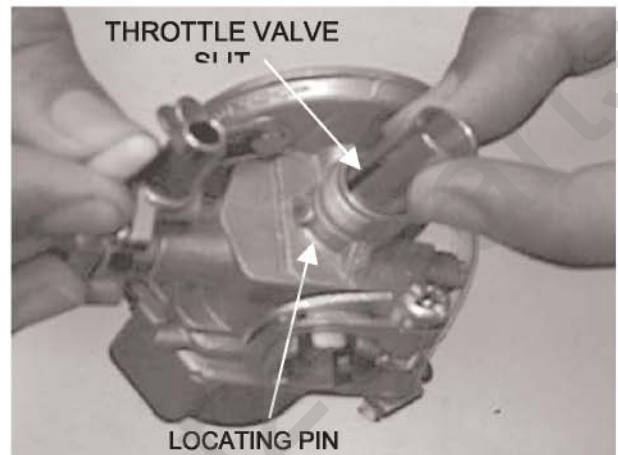
Install the needle clip on the needle jet.

**STANDARD SETTING:** 2nd groove from the top. Install the jet needle into the throttle valve and secure it with the needle clip retainer.

Install the spring and throttle valve.

Align the throttle valve slit with the locating pin in the carburetor body and install the carburetor top onto the carburetor.

Adjust throttle lever free play.



## 5. ENGINE COMBUSTION SYSTEM

### 5.1 CYLINDER REMOVAL

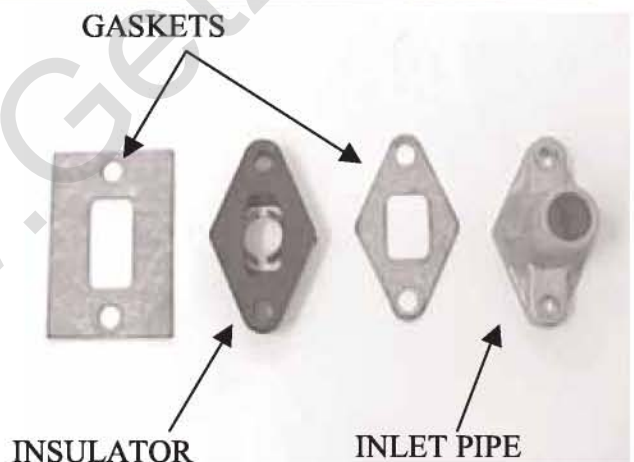
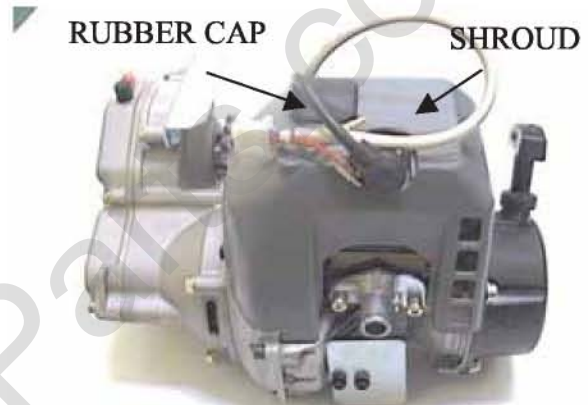
Remove the air cleaner and carburetor.

Remove the Ignition Coil assembly.  
Remove the cylinder shroud rubber cap and shroud.

Remove the spark plug.

Remove the inlet pipe insulator and gasket.

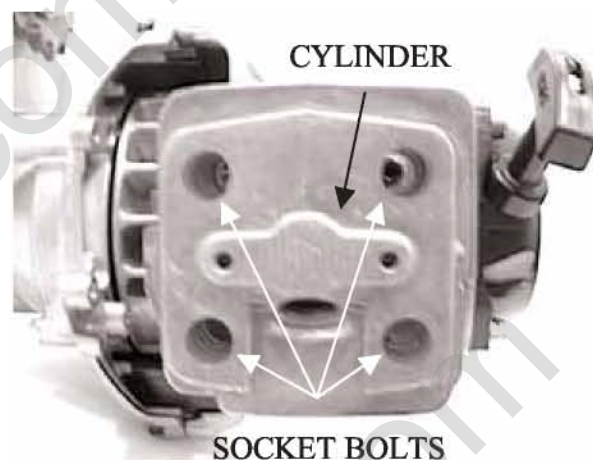
## COMBUSTION SYSTEM





# COMBUSTION SYSTEM

Remove the cylinder.



## 5.2 INSPECTION

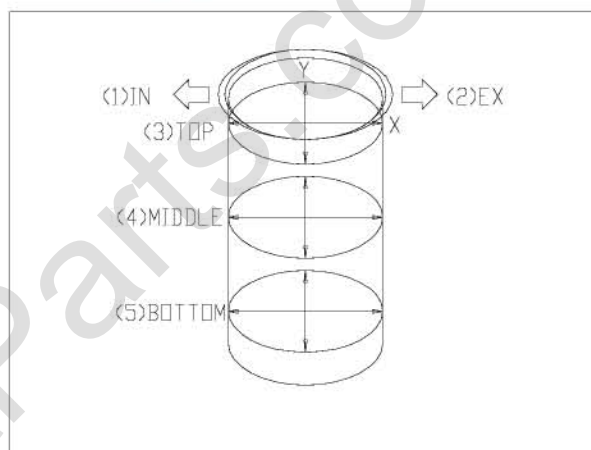
Inspect the cylinder bore for wear or damage.

Measure the cylinder inner diameter at three levels in an X and Y axis. Calculate cylinder taper at three levels in an X and Y axis.

Take the maximum reading to determine the taper.

**TAPER LIMIT : 0.01mm**

Calculate the cylinder out-of-round at three levels in the X and Y-axis. Take the maximum reading to determine the out-of-round. Out OF ROUND: **0.10mm**



## 5.3 PISTON REMOVAL

Remove the piston pin clips with needle nose pliers.

**NOTE: Don't allow the clips fall into the crankcase.**



Press the piston pin out of the piston.



## COMBUSTION SYSTEM

Spread each piston ring and remove it by lifting up at a point opposite gap.



Insert each piston ring into the cylinder and measure the end gap.

**SERVICE LIMIT: 0.5 mm**



Measure the clearance between the ring and groove.

**SERVICE LIMIT: 0.09 mm**



Measure the piston outer diameter at 10mm up from the skirts bottom.

**SERVICE LIMIT: 39.9 mm**



Measure the piston pin outer diameter.

**PIN BORE SERVICE**

**LIMIT: 10.04 mm**

Measure the piston pin bore.

**PIN OUT DIAMETER**

**SERVICE LIMIT: 0.96 mm**

Remove the con-rod 2 bearing and washer.

Inspect the washer and bearings for wear or damage.



# COMBUSTION SYSTEM

## 5.4 PISTON RING INSTALLATION

Clean the piston ring grooves thoroughly and install the piston rings.

**NOTE:** Avoid piston and piston ring damage during installation.

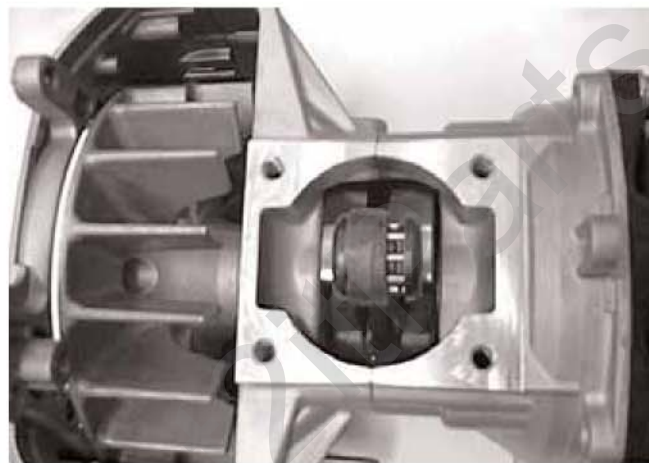


Align the piston rings slit with the lobe on the grooves. After installation, the rings should be free to rotate in the ring grooves.



## 5.5 PISTON INSTALLATION

Install the connecting 2 bearing and washer.



Install the piston with its mark on the Inlet Pipe side. Install the piston, piston pin, and new pin clips.

**NOTE:**

Don't allow the clip to fall into the crankcase.





# COMBUSTION SYSTEM

## 5.6 CYLINDER INSTALLATION

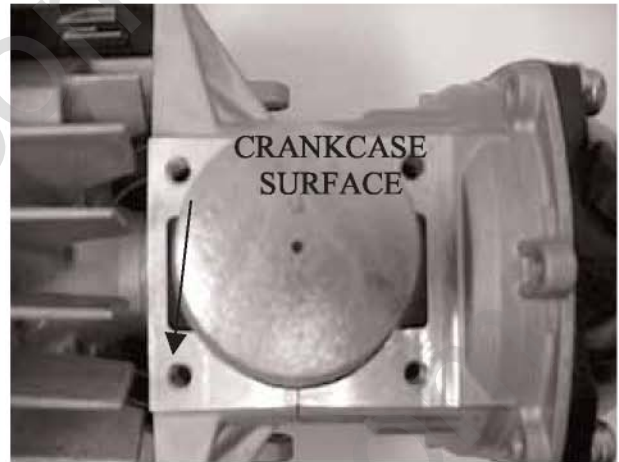
Clean off any gasket material from the crankcase surface.

**NOTE:** Be careful not to damage the crankcase surface.  
Install a new gasket.

Coat the cylinder bore and piston rings with engine oil and install the cylinder.

**NOTE:** Avoid damaging piston rings during installation.

Install the spark plug and cylinder shroud.



## 6. STARTER SYSTEM

## STARTER SYSTEM

### 6.1 STARTER REMOVAL - RXL-40, IXL-40

Remove the left crankcase cover.



Remove the collar and return pull spring.  
Do not remove the reel unless the starter is damaged.

**NOTE:**

Be careful to remove the reel and prevent the spring from flicking away.  
Inspect the spring for wear or damage and replace if necessary.



### 6.2 CRANKCASE DISASSEMBLY

Remove the clutch one-way and L-crankcase plate.

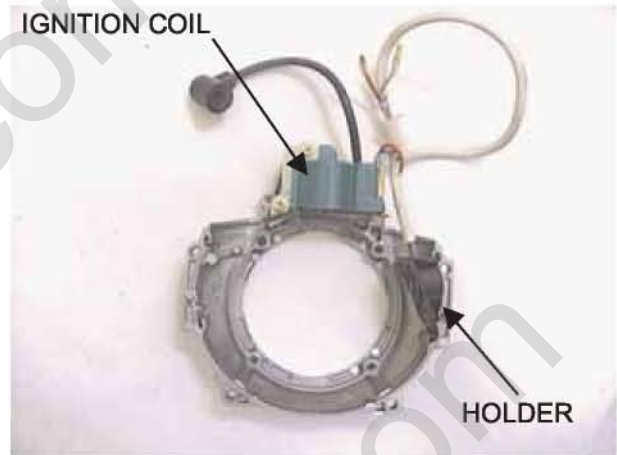


Remove the right crankcase cover. Remove the clutch weight set and washer.

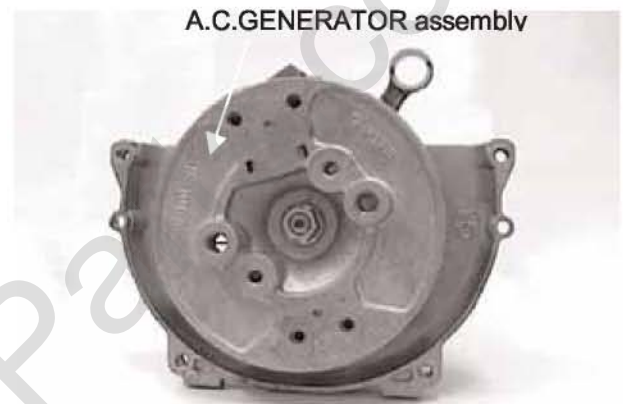


## STARTER SYSTEM

Remove the holder and ignition coil assembly.



Remove the A.C. generator assembly.



Disassemble the right crankcase and left crankcase.



Remove the crankshaft composition.



## STARTER SYSTEM

### 6.3 INSPECTION

Assemble the crankshaft composition and right crankcase.

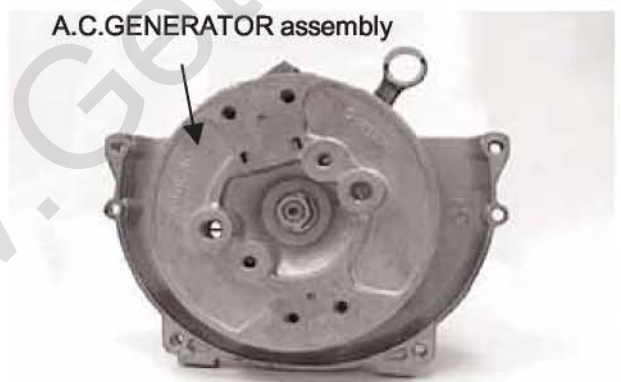
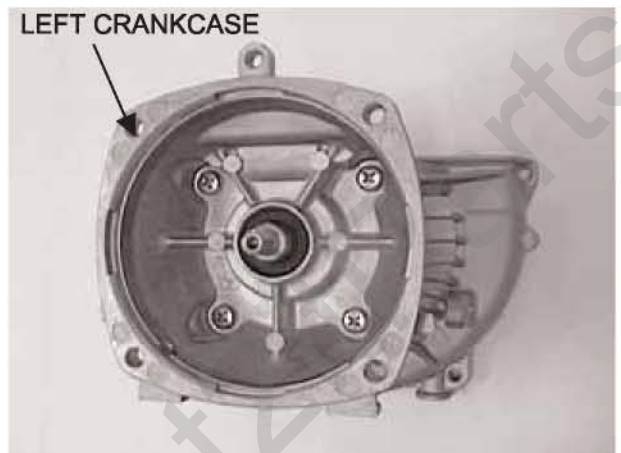
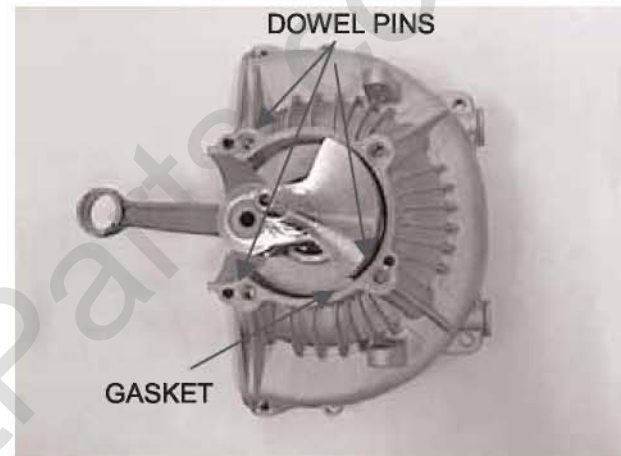
Clean off the gasket material and install the dowel pins and a new gasket.

Assemble the right crankcase and left crankcase.

### 6.4 RIGHT CRANKCASE ASSEMBLY

Install the A.C. generator assembly.

Install the holder.





## STARTER SYSTEM

Install the dowel pins and ignition coil assembly.



Assemble the right crankcase and right crankcase cover.



### 6.5 LEFT CRANKCASE ASSEMBLY

Install the L-crankcase plate and clutch one-way.



Install the left crankcase cover.



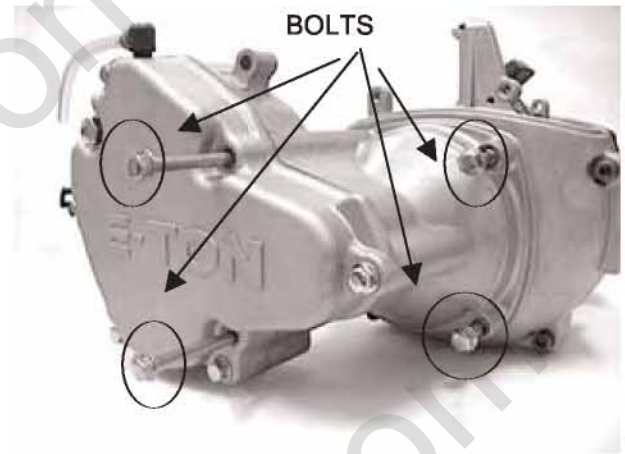
## STARTER SYSTEM

### 6.6 CLUTCH OUTER REMOVAL

Remove the gearbox from the right crankcase cover.

**NOTE:**

The four bolts shown are green; the others are gold.



Remove the flange nut and clutch outer composition from gear box.



Remove the bolts, washers, and clutch weight set from the A.C. generator assembly. Inspect and clean the clutch shoes before reinstalling.



### 6.8 INSPECTION

Check the removed parts for wear or damage.

Measure the relaxed length of the spring.

**SERVICE LIMIT: 47.5 mm**

Measure the clutch weight set **0.0**.

**SERVICE LIMIT: 76.8mm**

Replace the parts if necessary.



## STARTER SYSTEM

### 6.9 WEIGHT INSTALLATION

Install the washer, bolts, and clutch weight set on the A.C. generator assembly.



### 6.10 CLUTCH OUTER INSTALLATION

Install the clutch outer composition on the gearbox.



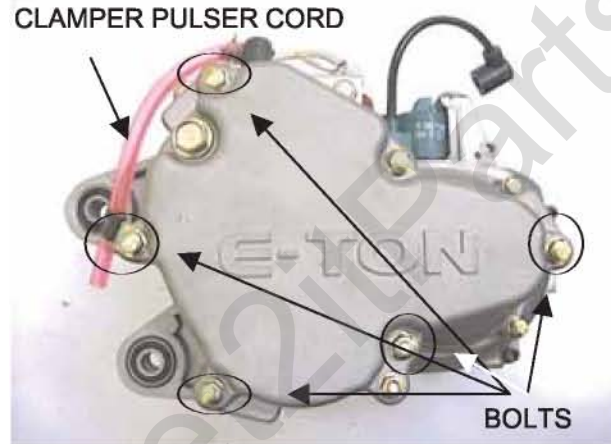
Assemble the gearbox and right crankcase cover.



## 7. TRANSMISSION SYSTEM

### 7.1 GEAR BOX SEPARATION

Remove the sprocket and fixing plate from the final shaft. Check the sprocket for damage and replace if necessary.



Remove the five bolts and one clamber pulser cord.

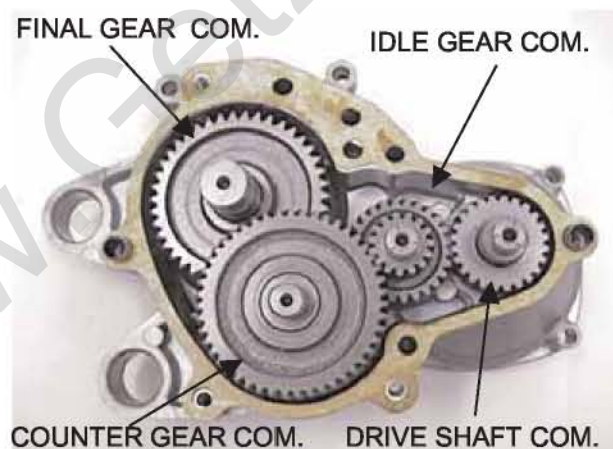
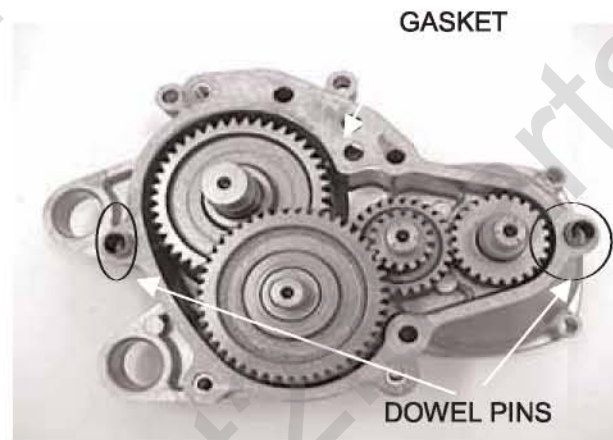
Remove the gearbox cover while tapping the cases at several locations with a rubber mallet or soft hammer.



Remove the dowel pins and gasket. **GEAR SHAFT**

### DISASSEMBLY

Remove the counter gear composition. Remove the idle gear composition. Remove the final shaft composition. Remove the drive shaft composition.





## 7.2 INSPECTION

Check the gears for abnormal wear or lack of lubrication.  
Replace the gears if necessary.

Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly.

Also check that the outer races of the bearings fit tightly in the gear box.

Replace the bearings if they are abnormal.



BEARINGS



## 7.3 GEAR SHAFT ASSEMBLY

Assemble the drive, final, idle and counter gear compositions in the reverse order of disassembly.



## 7.4 GEAR BOX ASSEMBLY

Clean off the gasket materials from the gearbox surface.  
Install the dowel pins and replace the gasket.

GEAR BOX SURFACE



## TRANSMISSION

Assemble the gear box and gear box cover.



Install one clamp pulser cord and tighten all the box bolts.

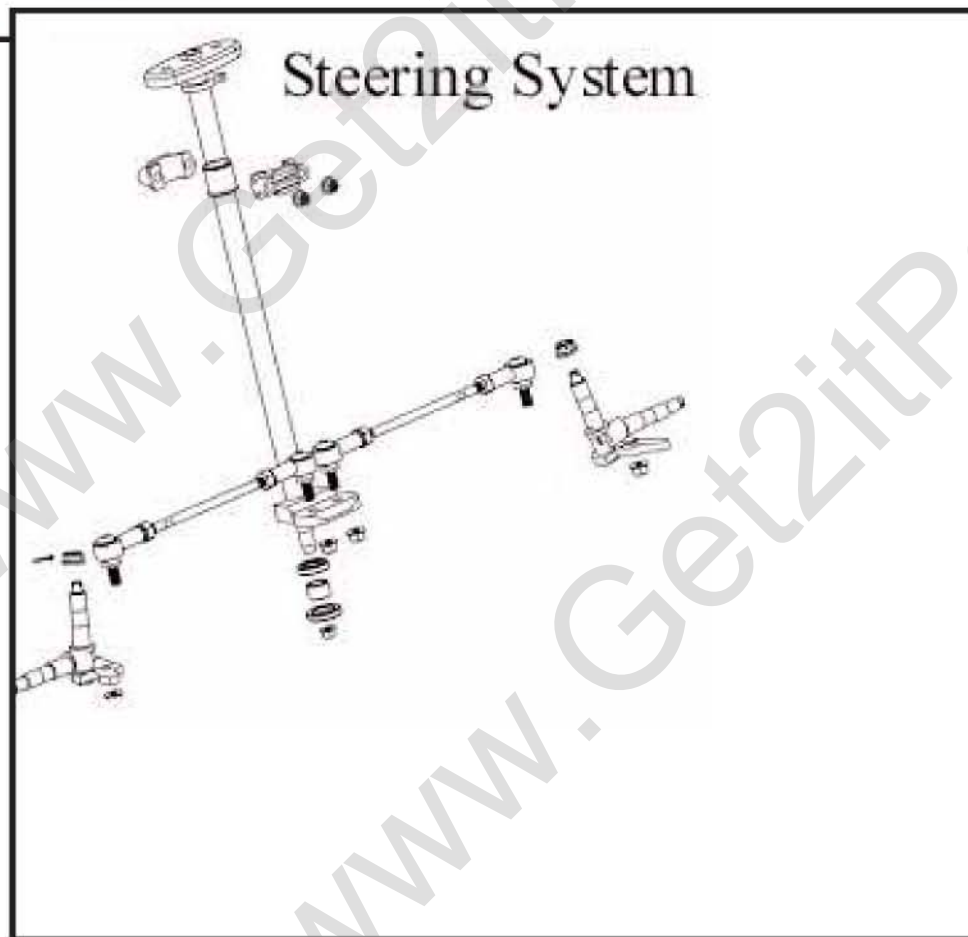
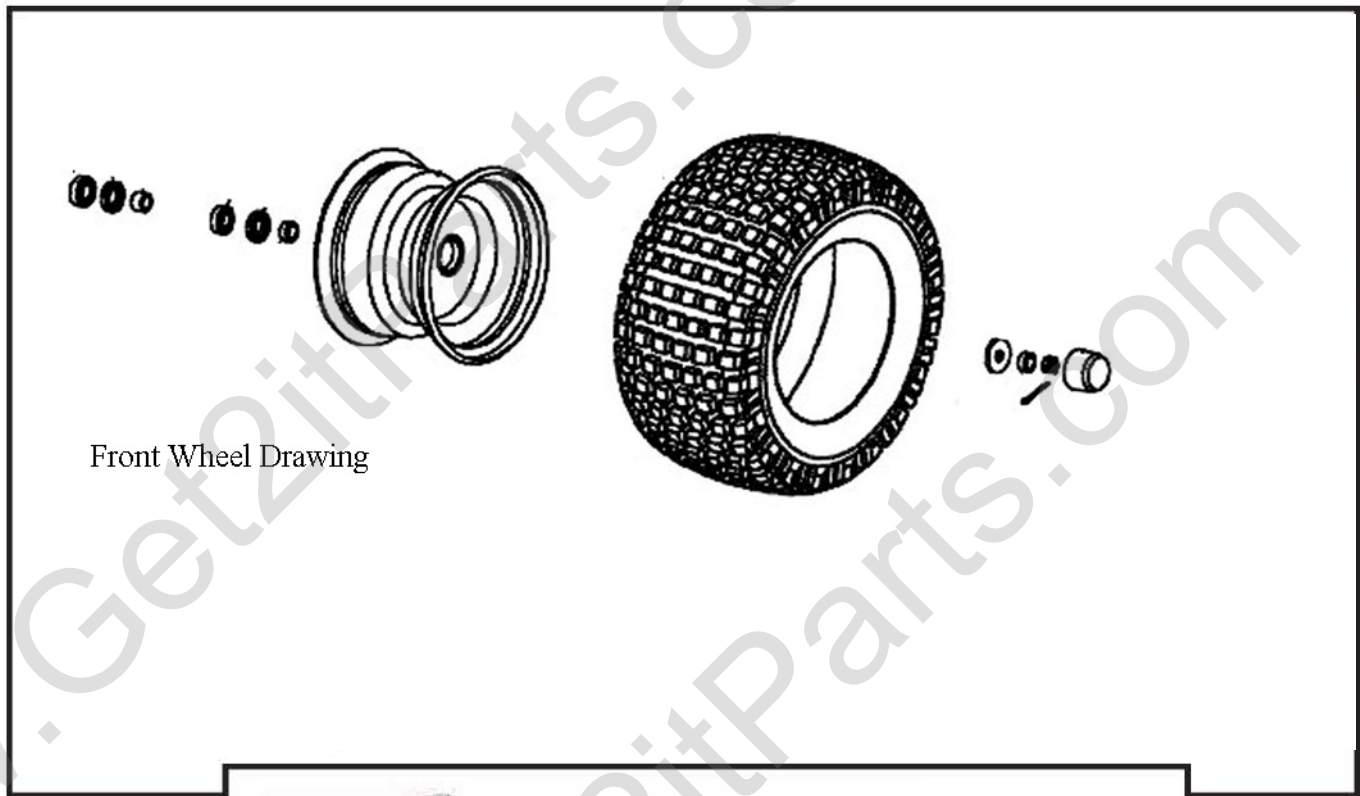


Install the sprocket and fixing plate on the final gear shaft.



## 8. FRONT WHEEL AND STEERING SYSTEM

### 8.1 THE PARTS DRAWING OF FRONT WHEELS AND STEERING SYSTEM



# FRONT WHEEL/STEERING

## 8.2 TROUBLESHOOTING

### **Hard steering**

Faulty tire  
Insufficient tire pressure  
Steering shaft nut too tight  
Damaged steering shaft bearing  
Faulty steering shaft lower bearing

### **Front wheel wobbling**

Bent rim  
Faulty tire  
Worn front wheel rim bearing  
Axle nut not tightened properly

### **Steers to one side**

Bent frame  
Bent tie rods  
Unequal tire pressure  
Wheel installed incorrectly  
Worn swing arm pivot bushings

### **Front suspension noise**

Shock absorber damper binding  
Loose front suspension fasteners

### **Hard suspension**

Faulty pivot bearing  
Bent shock absorber  
Bent shock absorber swing rod  
Faulty front swing arm bushings  
Improperly tightened swing arm pivot

### **Soft suspension**

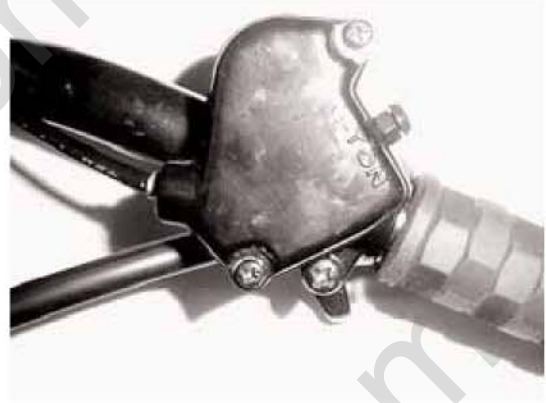
Weak spring  
Worn or damage swing arm bushings

## FRONT WHEEL/STEERING

### 8.3 HANDLEBAR

#### REMOVAL

Remove the throttle lever housing on the right handle bar.



Remove engine switch housing on the left handle bar.  
Remove rear brake level bracket.



Remove the bolts attaching the upper holder cover.  
Remove the handlebar holder and handlebar.



#### INSTALLATION

Put the handlebar on the lower holders.  
Make sure the handlebar punch marks align with the top of the lower handlebar holders.  
Install the upper handlebar holders with the L or R marks facing forward.  
Tighten the forward bolts first, and then tighten the rear bolts.  
Install the upper handlebar holder's cover.

Install the switch housing, aligning the boss with the hole.  
Tighten the upper screw first then tighten the lower one.





## FRONT WHEEL/STEERING

Install the rear brake lever bracket, aligning the boss with the hole. Tighten the screw securely.



Align the split line of the throttle housing and holder with the punch mark. Tighten the screw securely.



### 8.4 FRONT WHEEL

#### REMOVAL

Raise the front wheels off the ground by placing a block under the frame.  
Remove the front wheel nuts, washer, and wheels.

#### INSTALLATION

Install and tighten the four-wheel nuts.  
Torque: *55-65 N/m (35-45 ft-lbs.)*  
Remember put a cotter pin in the castle nut.



### 8.5 STEERING SYSTEM

#### REMOVAL OF KINGPIN AND TIE-ROD

Remove the front wheels.  
Remove the four self-lock nuts from the tie-rod ball joints and take off the two tie-rods.



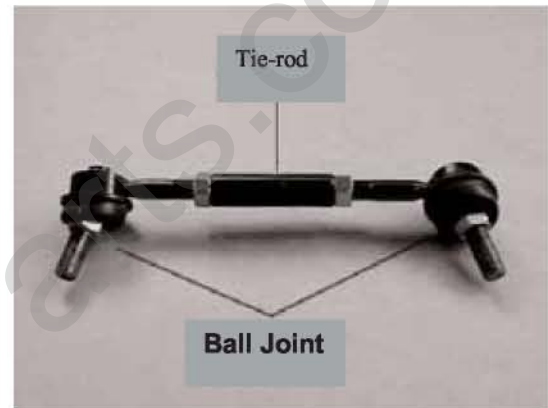
## FRONT WHEEL/STEERING

Take off the rubber cap on the kingpin.  
Unscrew the nut and remove the kingpin.



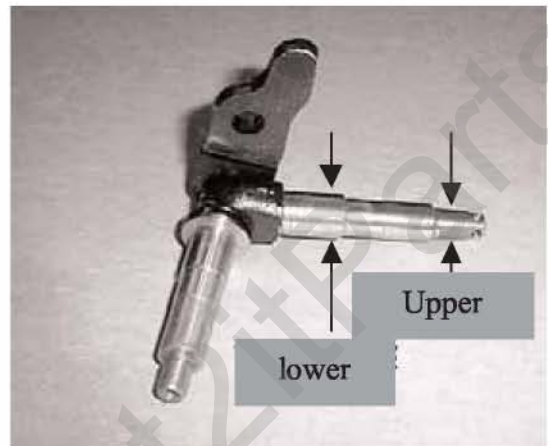
### TIE-ROD INSPECTION

Inspect the tie-rod for damage or bending.  
Inspect the ball joint rubbers for damage, wear, or deterioration.  
Turn the bolts of ball joints with fingers.  
The ball joints should turn smoothly and quietly.



### KINGPIN INSPECTION

Inspect the kingpin for damage or cracks.  
Measure the kingpin outer diameter. Upper  
minimum limit:  $\varnothing 15.40 \text{ mm}$  Lower  
minimum limit:  $\varnothing 16.90 \text{ mm}$



### KINGPIN BUSHING INSPECTION

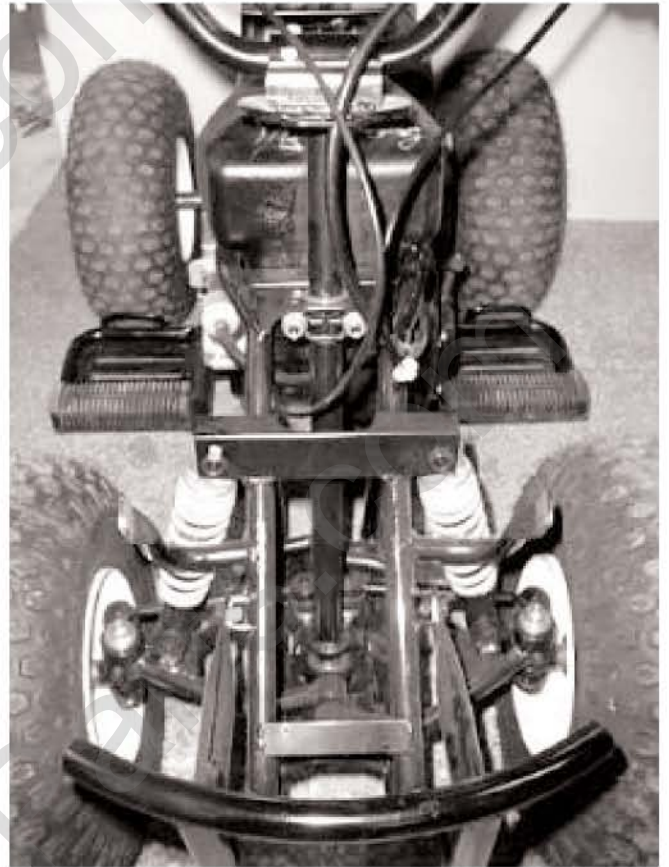
There are two bushings in the sleeve of front swing arm: the upper and lower bushing.  
Check the kingpin bushing for wear or damage.  
Measure the inner diameter of the bushing. Upper  
maximum limit:  $\varnothing 15.69 \text{ mm}$   
Lower maximum limit:  $\varnothing 17.19 \text{ mm}$



## FRONT WHEEL/STEERING

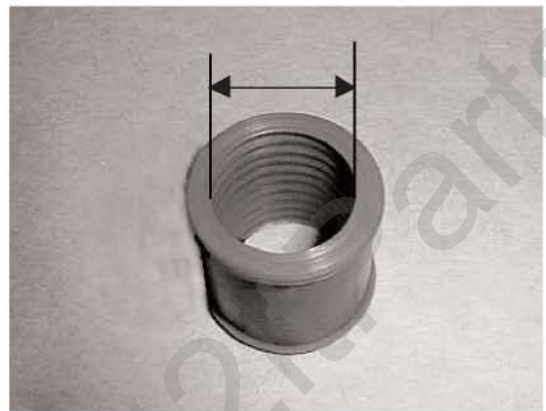
### STEERING SHAFT REMOVAL

Remove the handle bar and handle bar cover.  
(See chapter 8-3)  
Remove the front fender. (See chapter 10-3)  
Unscrew the steering shaft fixed out below shaft.  
Pull the steering shaft carefully.



### BUSHING INSPECTION

Remove the steering shaft.  
Remove the bushing from the shaft.  
Inspect the bushing for damage or wear; replace if necessary.  
Measure the bushing inner diameter.  
Maximum limit:  $\varnothing 22.8 \text{ mm}$



### STEERING SHAFT INSPECTION

Inspect the steering shaft for damage or cracks.  
Measure the steering shaft outer diameter in the location of the bushing.  
Minimum limit:  $\varnothing 22.0 \text{ mm}$





# FRONT WHEEL/STEERING

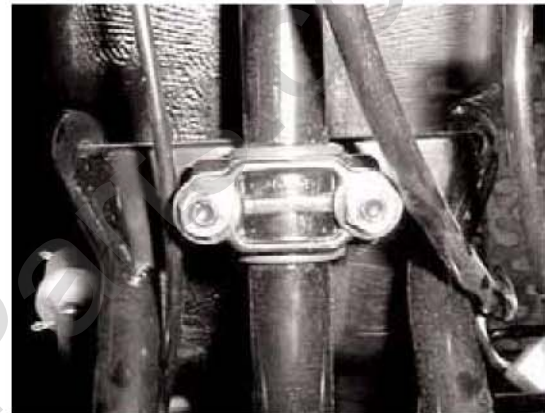
## STEERING SHAFT BEARING INSPECTION

Turn the shaft bearing with finger.  
The bearing is on the front part of frame.  
The bearing should turn smoothly and quietly.  
Also check that the bearing outer race fits in the holder.  
Replace the bearing if necessary.



## INSTALLATION OF STEERING SHAFT

Install the steering shaft with the bushing.  
Apply grease to the bushing.  
Install the bushing holder and tighten the nuts.  
Torque: *24-30 N/m (18-22 ft-lbs.)*



Install the steering shaft nut and tighten it.  
This nut is under this steering shaft.  
Torque: *50-60 N/m (35-45 ft-lbs.)*



## INSTALLATION OF KINGPIN

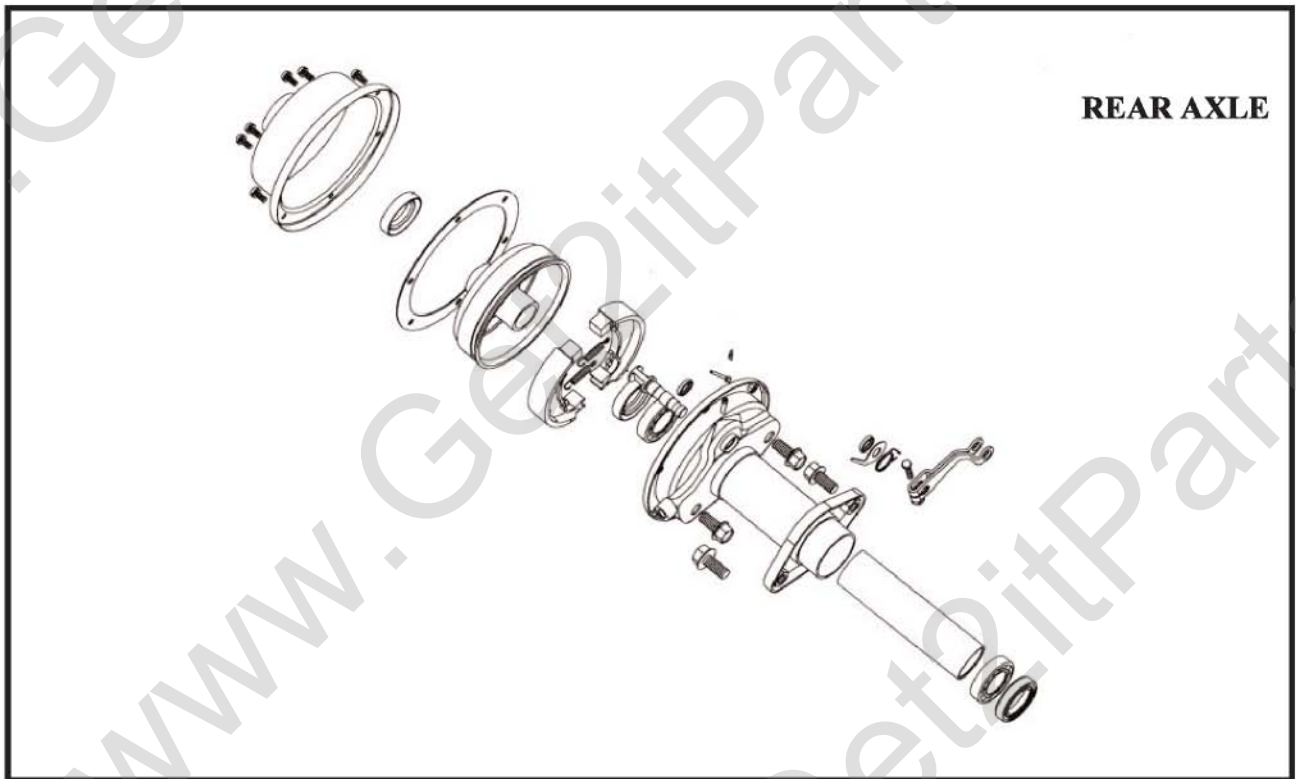
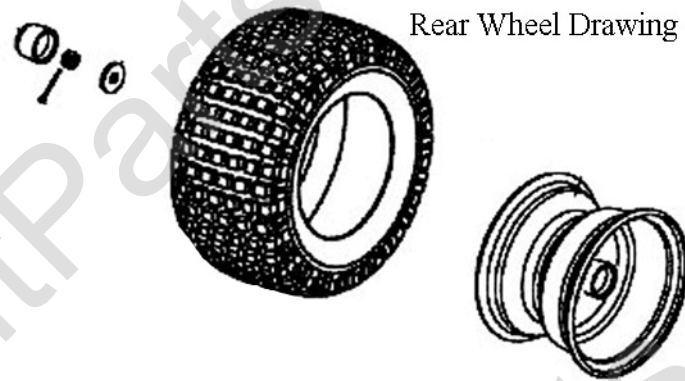
Use grease to lubricate the kingpin lower dust seal lips before installing. Pump grease into bushing and install the kingpin.

Tighten the kingpin nut.  
The setting torque is *30-40 N/m (22-30 ft-lbs.)*  
Fix the waterproof rubber cap.  
Install the tie-rod and tighten the nuts.  
The setting torque: *35-43 N/m (25-31 ft-lbs.)*  
Install the front wheel.  
Adjust the toe in. (see chapter 2)



## 9. REAR WHEEL SYSTEM

### 9.1 THE PARTS DRAWING OF REAR WHEEL SYSTEM



# REAR WHEEL SYSTEM

## 9.2 TROUBLESHOOTING

### Brake drag

- Sticking brake cam
- Sticking brake cable
- Incorrect brake adjustment

### Poor brake performance

- Worn brake cam
- Worn brake drum
- Worn brake shoes
- Improper brake adjustment
- Brake linings oily, greasy or dirty
- Brake shoes worn at cam contact area
- Brake arm serrations improperly engaged

### Rear wheel vibration or wobble

- Axle is not tightened well
- Bent rim
- Axle bearings are worn Faulty tires
- Rear axle bearing holder is faulty

### Rear suspension noise

- Shock absorber damper binding
- Loose front suspension fasteners

### Hard suspension

- Faulty pivot bearing
- Bent shock absorber
- Bent shock absorber swing rod
- Faulty front swing arm bushings
- Improperly tightened swing arm pivot

### Soft suspension

- Weak spring
- Worn or damage swing arm bushings

### 9.3 REMOVE REAR WHEEL AND REAR BRAKE

Lift the rear wheels off the ground.  
Release the cotter pin, axle nut and washer.  
Release the wheel and wheel hub.

### REAR WHEEL SYSTEM



Remove the brake drum cover.



Remove the axle collar and brake drum.



Check the brake lining thickness.  
The minimum limit is **2.0 mm**.

Check the brake drum for damage.  
Replace if necessary.  
Check the brake drum inner diameter.  
The maximum limit is **131 mm**.





## REAR WHEEL SYSTEM

### 9.4 DRIVE MECHANISM

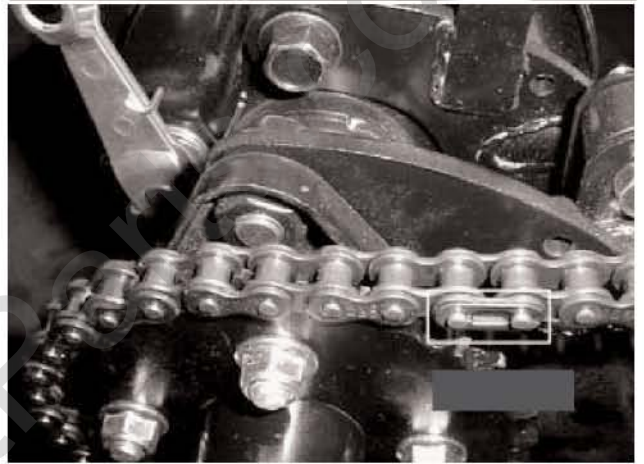
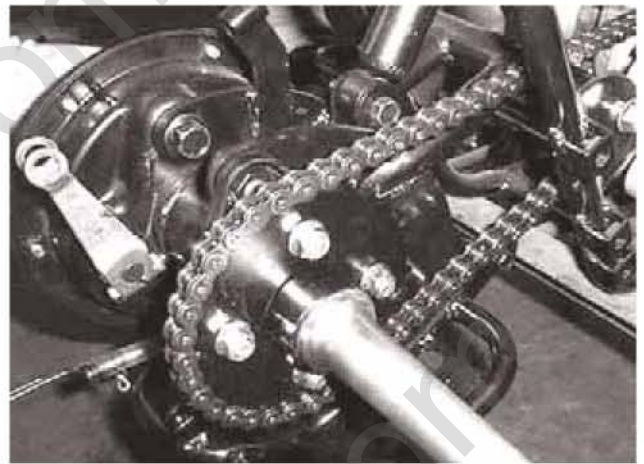
#### REMOVAL AND INSPECTION

Remove the rear wheel and the rear brake.  
Remove the drive chain under cover.

Disassemble the chain retaining clip and master link.

Disassemble the driven sprocket, axle, and sprocket collar. Check the driven sprocket for damage or wear.

Let the rear axle lie on V-blocks and check the run out.  
The run out limit is 0.5 mm





## REAR WHEEL SYSTEM

Check the turning of bearing with fingers.  
The bearings should turn smoothly and quietly.  
Replace if necessary.

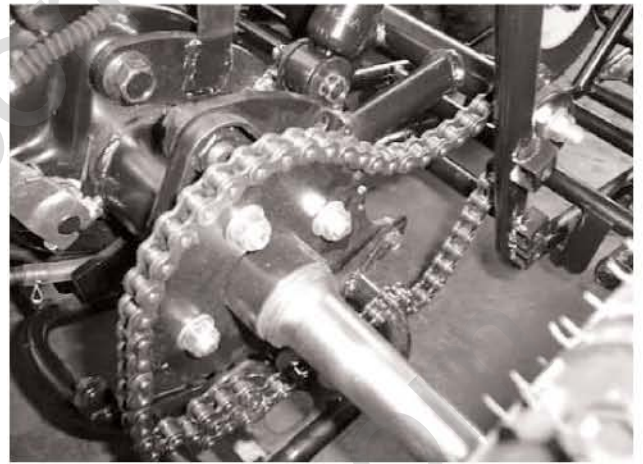
### INSTALLATION

Add grease to the dust seal lips and install dust seals.  
Assemble the rear axle and the driven sprocket.

Assemble the drive chain on the driven sprocket.  
Assemble the master link and retaining clip. Note  
the retaining clip direction. Install the drive chain  
cover. Assemble the chain under cover.

### 9.5 REAR BRAKE AND WHEEL INSTALLATION

Install the brake panel  
Add grease to the brake cam and anchor pin.  
Install the brake arm spring and oil seal.

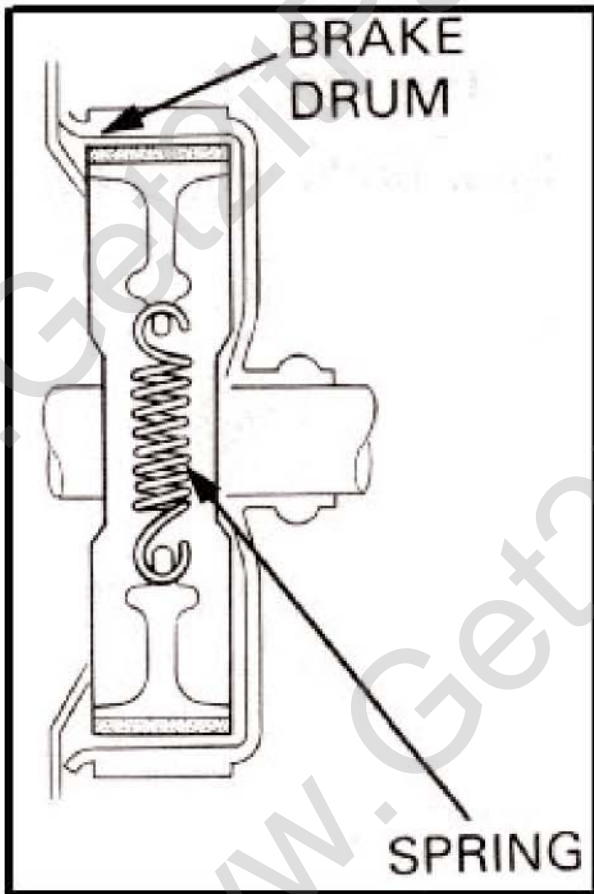
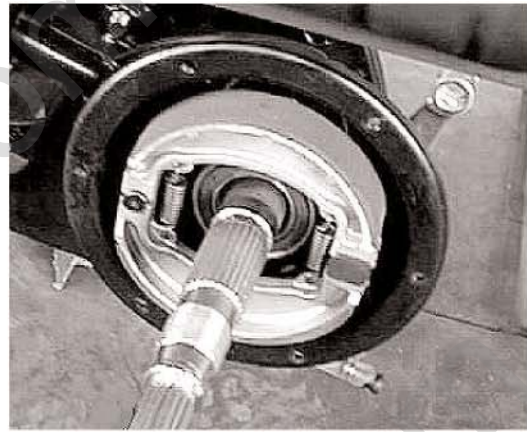


## REAR WHEEL SYSTEM

Assemble the brake arm aligning the punch marks on the cam and the arm.

Tighten the brake arm bolt and nut with **7-12 N/m torque. (5-9 ft-lbs.)**  
Install the adjusters.

Install the brake shoes and springs to their original positions.



Assemble the brake drum, axle collar, and brake drum cover.  
Assemble the wheel.  
Tighten the rear axle nut with **60-80 N/m. (44-60 ft-lbs.)**  
Install a new cotter pin.  
Adjust rear brake lever.  
Adjust chain slack.

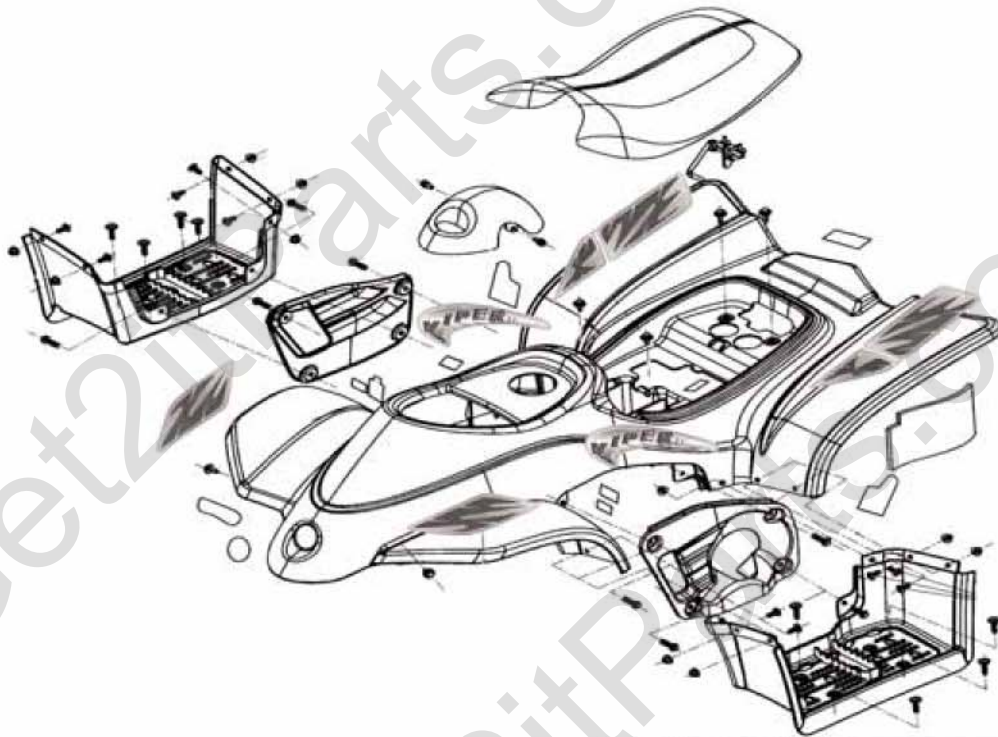




# BODY COVER & EXHAUST MUFFLER

## 10. FENDERS AND EXHAUST PIPE

### 10.1 FENDERS DRAWING



### 10.2 FENDER REMOVAL

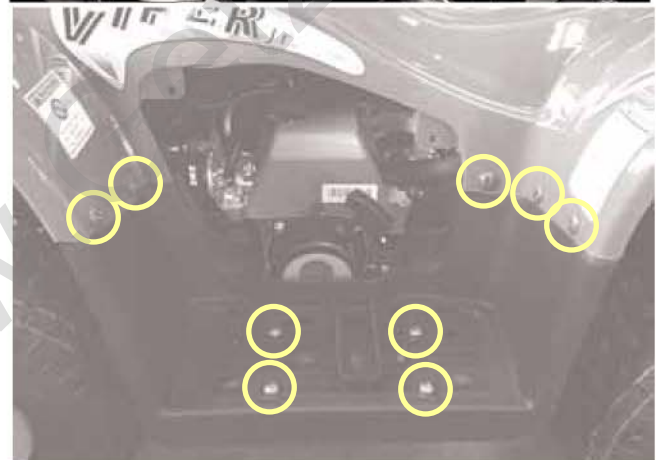
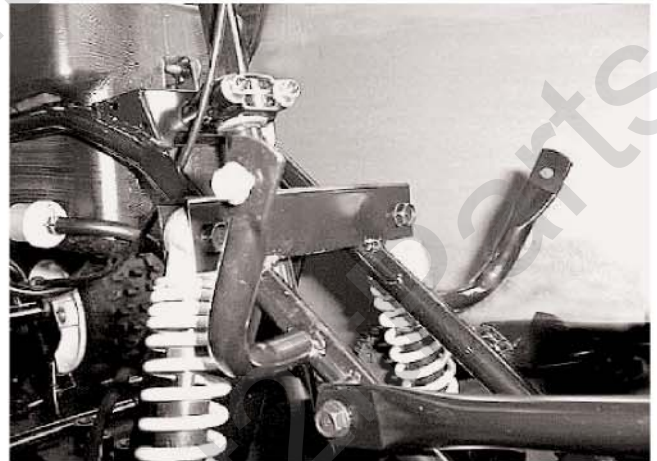
Release the seat by pulling the release bar just under the fender.

Remove the handle bar assembly and handle bar cover.

Unscrew the fuel tank cap.

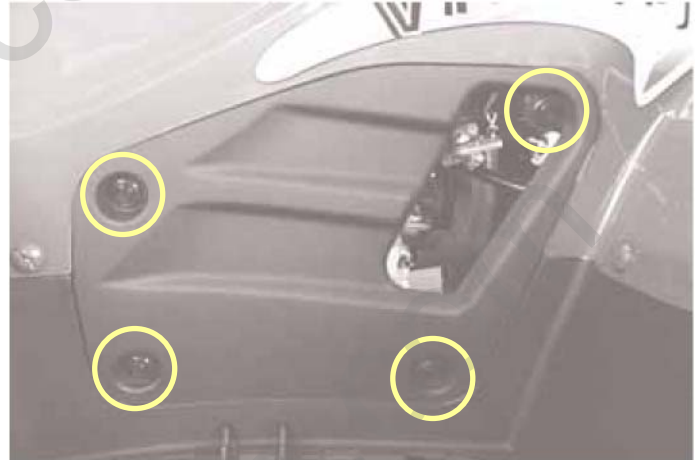
Unscrew the two bolts which fix the fender on the fixed bracket just behind the front wheels. (See picture)

Unscrew the 9 bolts which connect the fender and right & left footrest. ( See picture )



# BODY COVER & EXHAUST MUFFLER

Remove the four bolts which connect the body cover and right & left fender side cover. (See picture)

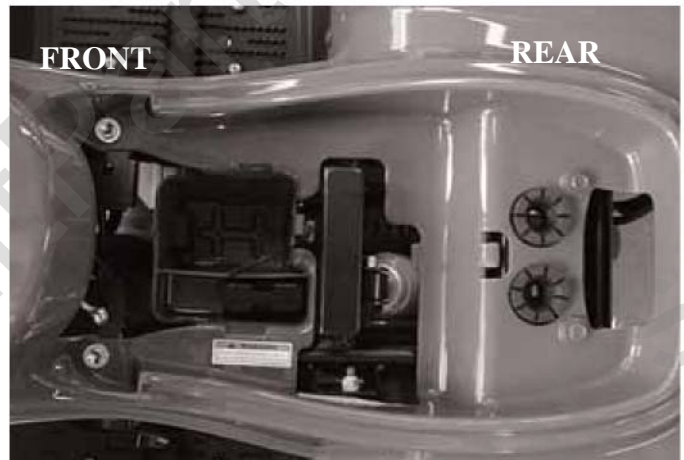


Remove the four bolts which connect the body side cover and footrest.

Remove the two bolts which attach the body cover on the center frame. (See picture)

Remove the two bolts which attach the body cover on the rear frame.

The body cover can now be removed from the frame.

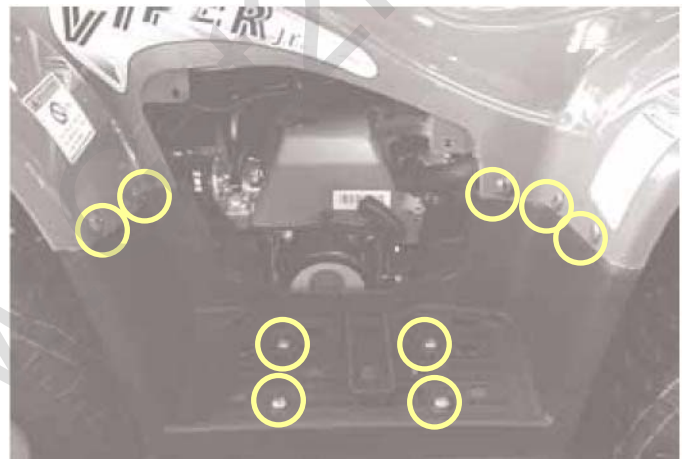


## 10.3 FOOTREST COVER REMOVAL

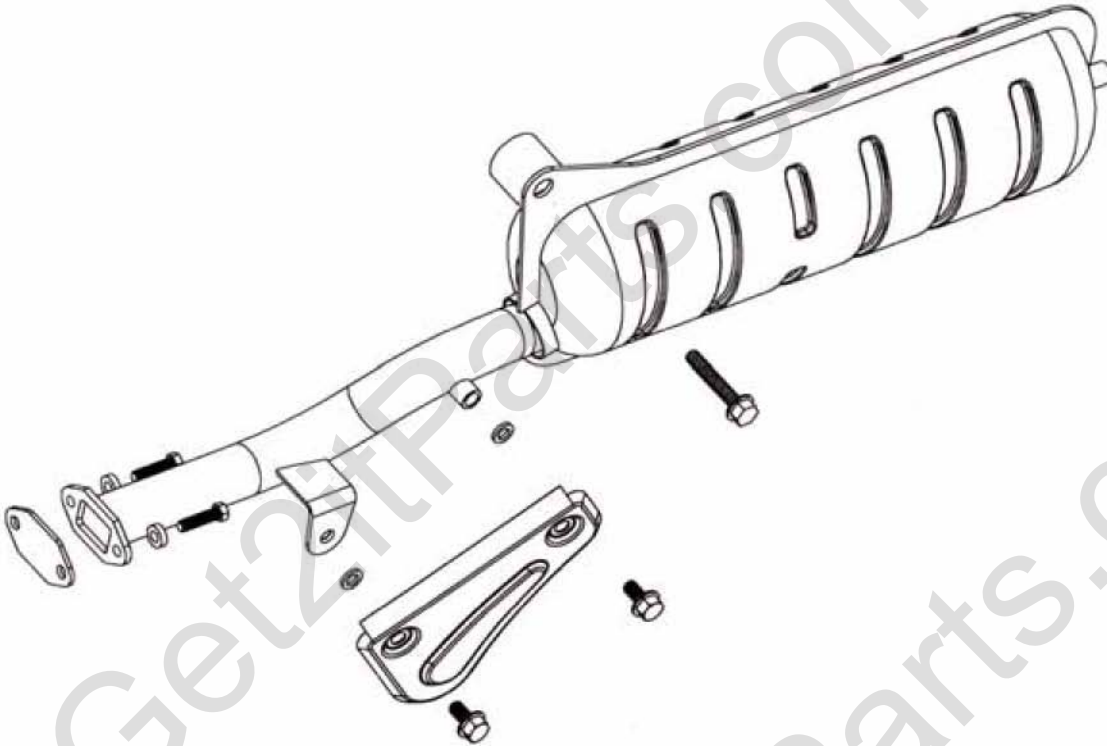
Remove the seat (see chapter 10.2)

Unscrew the nine bolts that attach the footrest to the footrest assembly. (See picture)

Remove the footrest cover from the footrest frame



# Body Cover & Exhaust Muffler



## 10.5 EXHAUST PIPE REMOVAL

The exhaust system becomes extremely hot after running the unit. Ensure that the exhaust system has completely cooled before servicing.

Remove the exhaust pipe nuts that attach the manifold to the engine.

Remove the exhaust pipe mounting bolts that attach the exhaust pipe and muffler assembly to the frame. Carefully remove the exhaust pipe and muffler system from the unit.

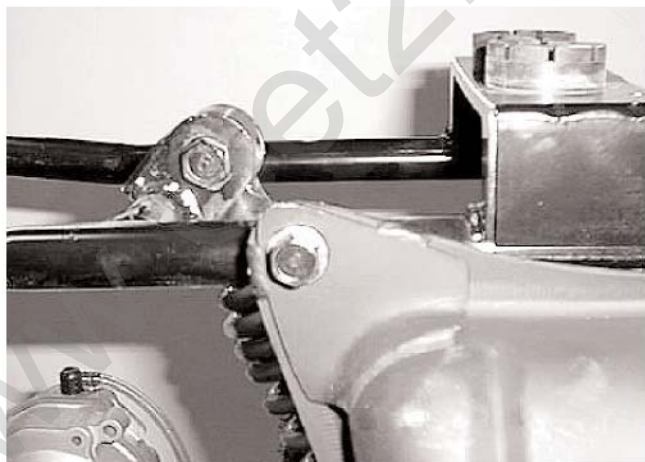
Inspect the exhaust system for rust or holes. Replace the exhaust pipe and muffler system if damaged or leaking. Clean the manifold gasket material from the engine and exhaust manifold before replacing.

Inspected the exhaust pipe for carbon build up or other obstructions and clean if needed.

## 10.6 EXHAUST PIPE INSTALLATION

Installation is the reverse order of removal.

Torque: Exhaust muffler bolts 30-35 N/m (22-26 ft-lbs.) After installation, make sure that there are no exhaust leaks.





## 11. ELECTRICAL SYSTEM

## ELECTRICAL SYSTEM

### 11.1 TROUBLESHOOTING

#### ENGINE STARTS BUT STOPS

Improper ignition timing  
Faulty spark plug No  
spark at plug

#### NO SPARK AT PLUG

Engine stop switch at "OFF" Safety  
Tether switch disconnected Poor  
connection:  
Between CDI and ignition coil  
Between CDI and engine stop switch  
Between CDI and body ground  
Between ignition coil and spark plug  
Faulty ignition coil  
Faulty CDI unit  
Faulty engine stop switch

#### ENGINE STARTS BUT RUNS POORLY

Ignition primary circuit  
Loose contact at terminals  
Faulty plug cap Faulty plug  
Faulty ignition coil  
Faulty engine stop switch  
Ignition secondary circuit  
Faulty coil wire  
Loose connection at spark plug wire  
Improper ignition timing Faulty CDI  
unit

#### ENGINE INTERMITTENT POWER

Loose battery connection  
Low battery charge on receiver or transmitter

#### ENGINE STOP CONTROLLER NON-OPERATIONAL

Safety tether switch disconnected  
Faulty remote controller Low charge  
in controller battery Faulty controller  
receiver Low charge in receiver  
battery

## 11.2 IGNITION COIL - RXL-40

Remove the spark plug cap from the spark plug.  
Disconnect the ignition coil primary wire.

Measure the primary coil resistance.

STANDARD:  $0.1 - 0.3(20)$

Measure the secondary coil resistance with the spark plug cap in place.

STANDARD:  $7.4 - 11 k(20)$

## 11.3 IGNITION TIMING

The ignition advance is  $15^\circ \pm 3^\circ/4000rpm$

The Capacitive Discharge Ignition (CDI) system is factory pre-set and does not require adjustment.

## 11.4 SAFETY REMOTE CONTROLLER & CONTROLLER RECEIVER

The controller has a maximum effective distance of 30 ft To maintain the effective distance of the controller, the batteries must be kept at or near full charge.

Check battery charge level before each use and replace when charge becomes low.

Remove batteries from both the transmitter and receiver if unit will not be used for an extended period of time.

The standard battery is 12V 23A.

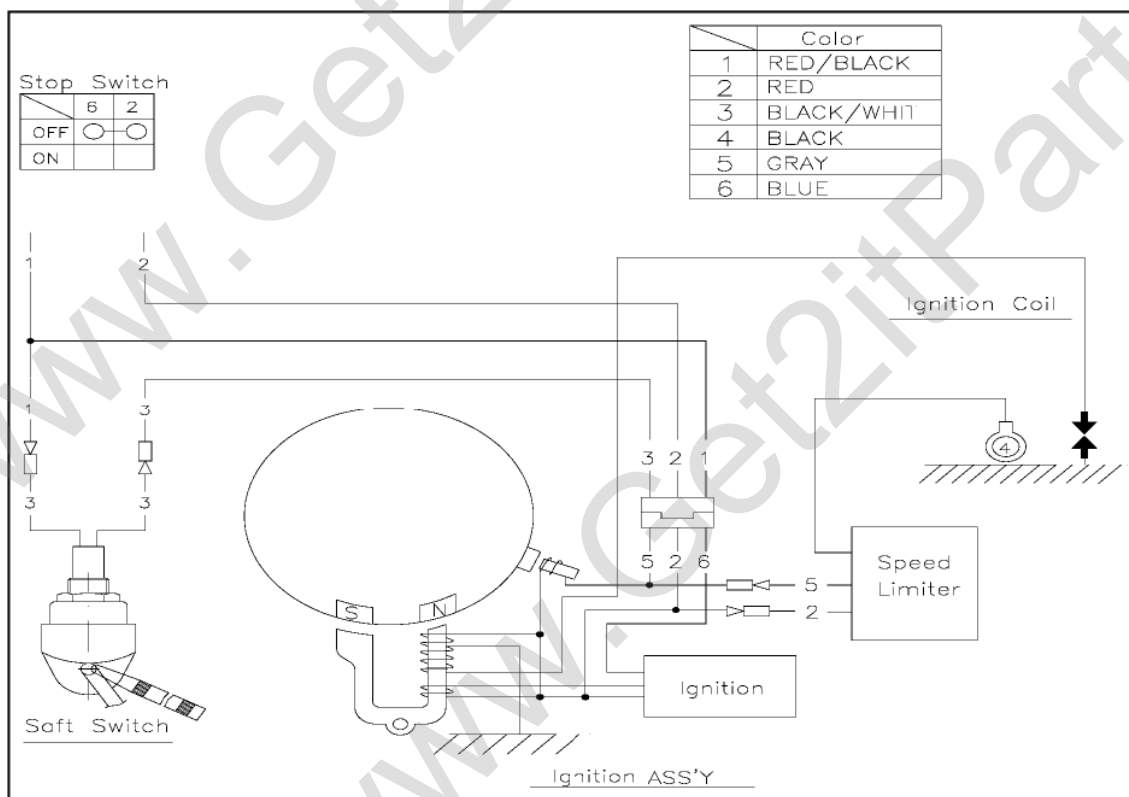
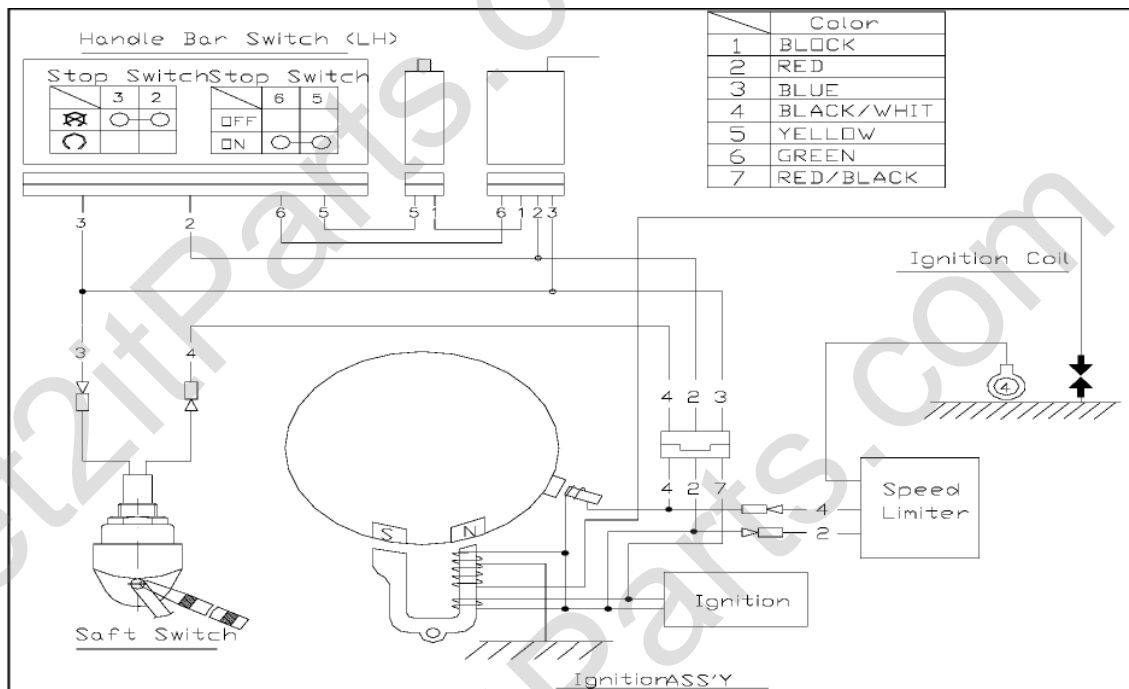
The controller receiver battery is located under the seat. USE ONLY Alkaline batteries (4 \* AA) in the receiver.

# ELECTRICAL SYSTEM

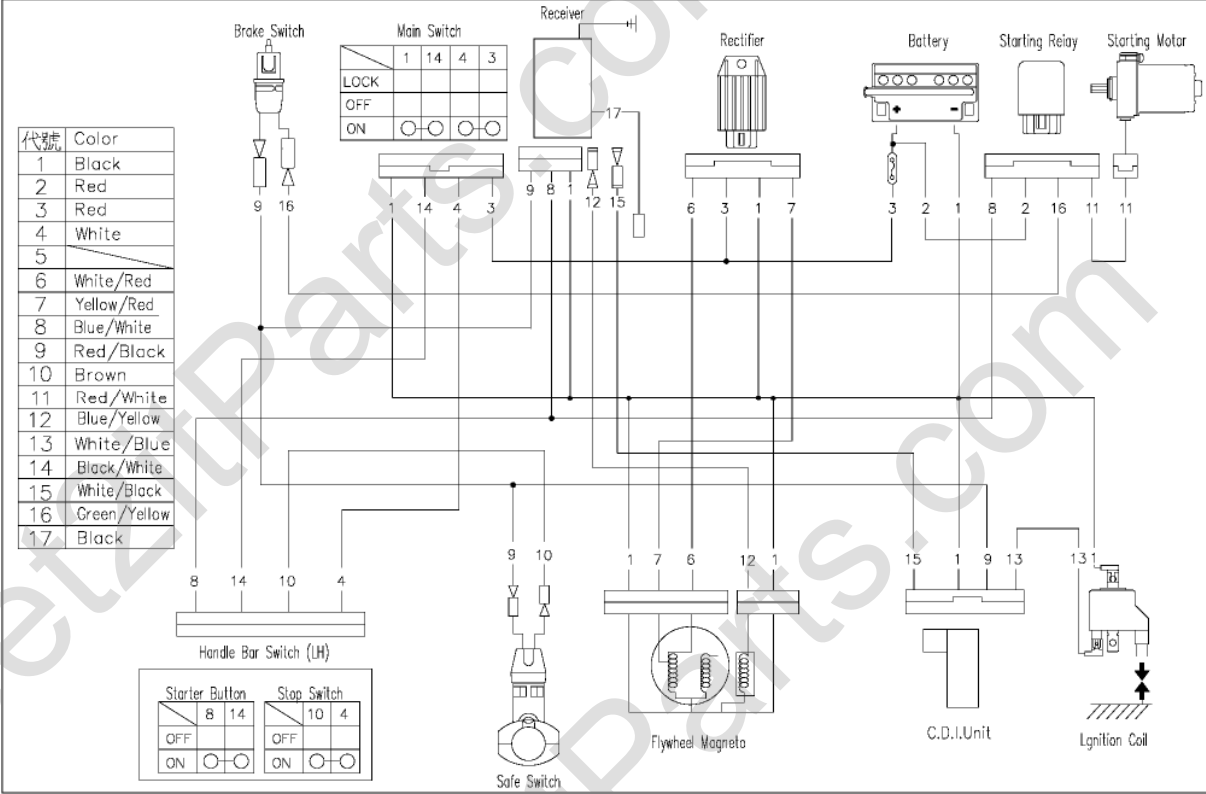


## 11.5 WIRING DIAGRAMS

FOR RXL40 FOR IXL40



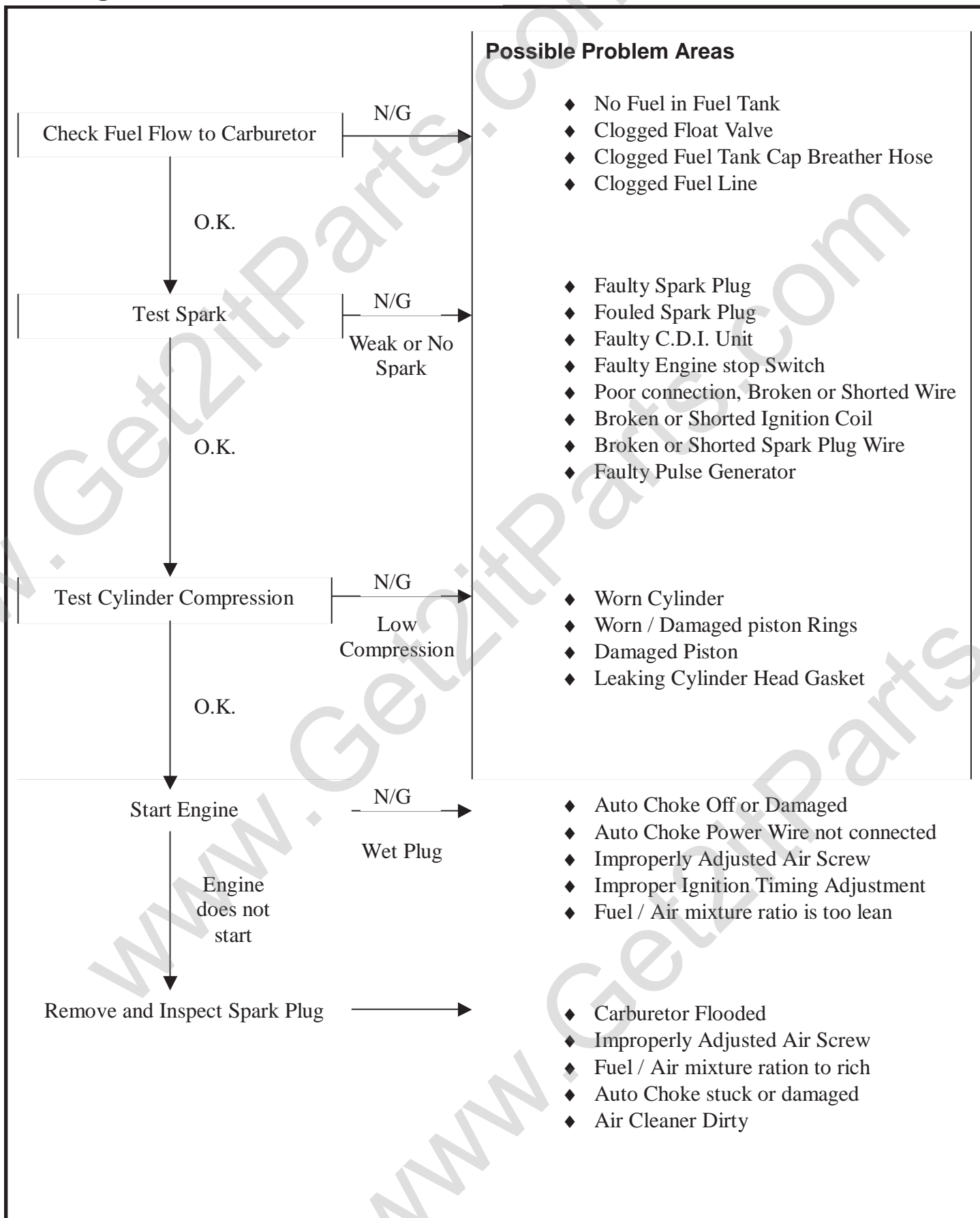
FOR RXL 40E



## 12. TROUBLE SHOOTING

## TROUBLE SHOOTING

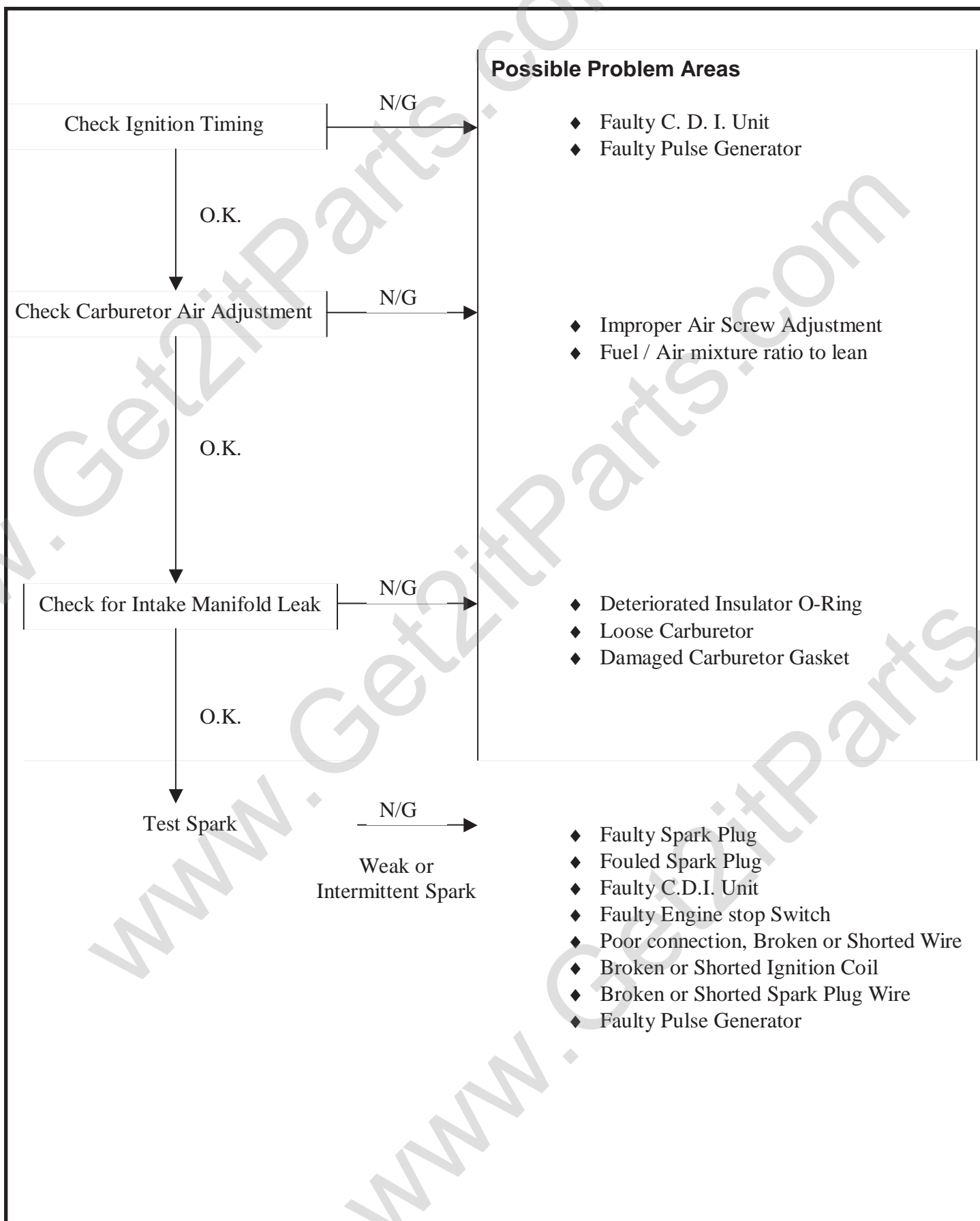
### 12.1 Engine does not start





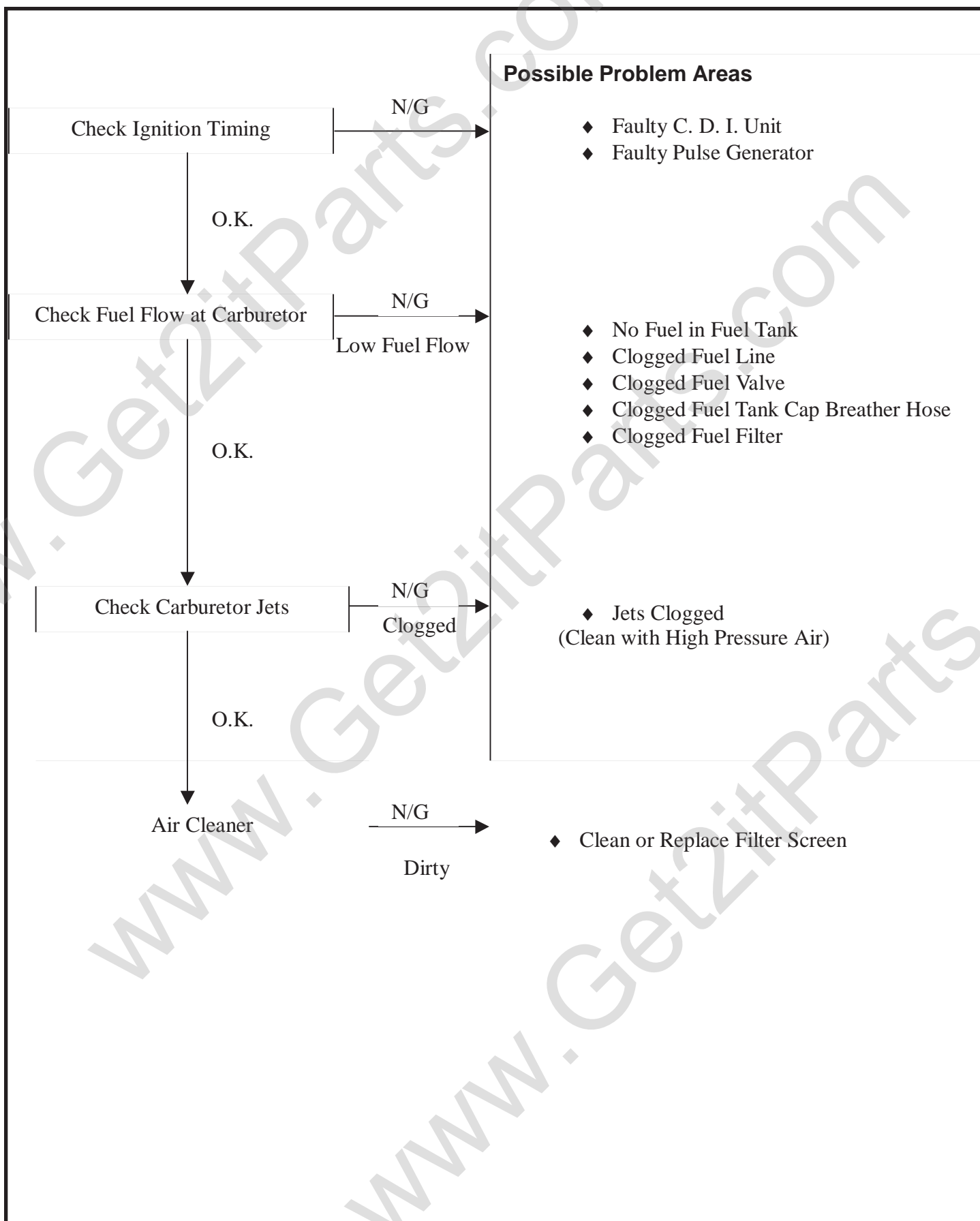
## 12.2 POOR PERFORMANCE AT LOW IDLE SPEED

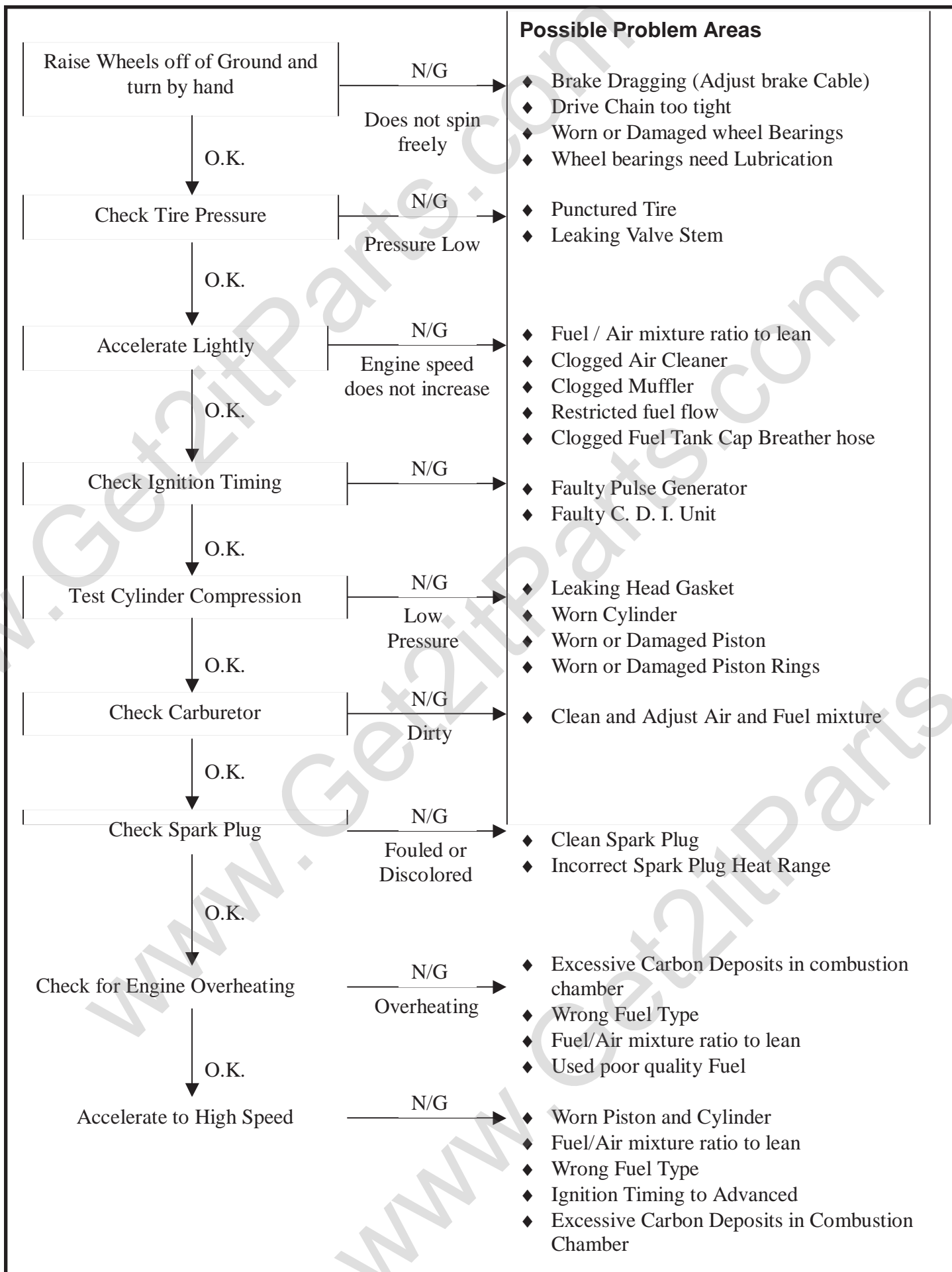
## TROUBLE SHOOTING

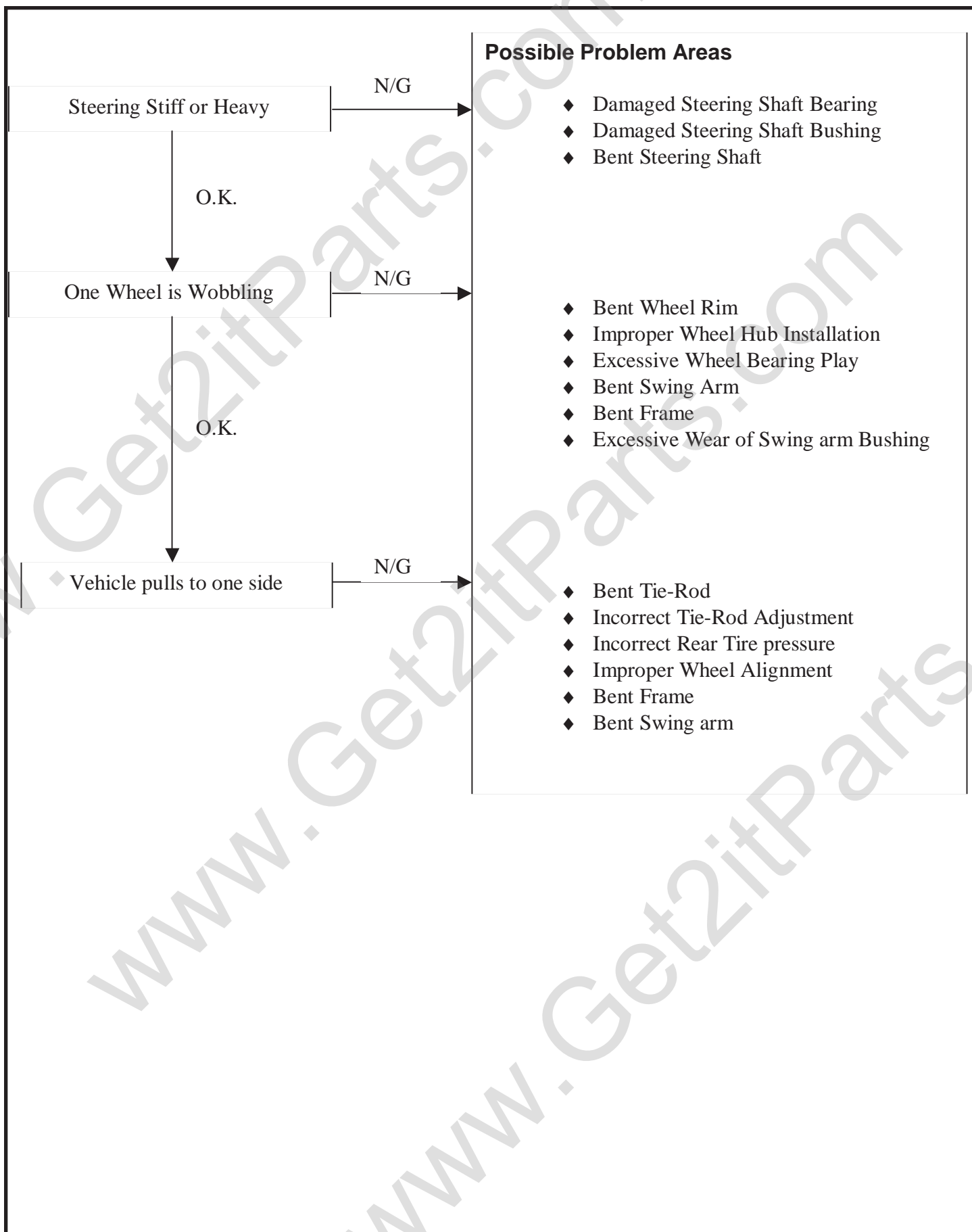


## 12.3 POOR PERFORMANCE AT HIGH SPEED

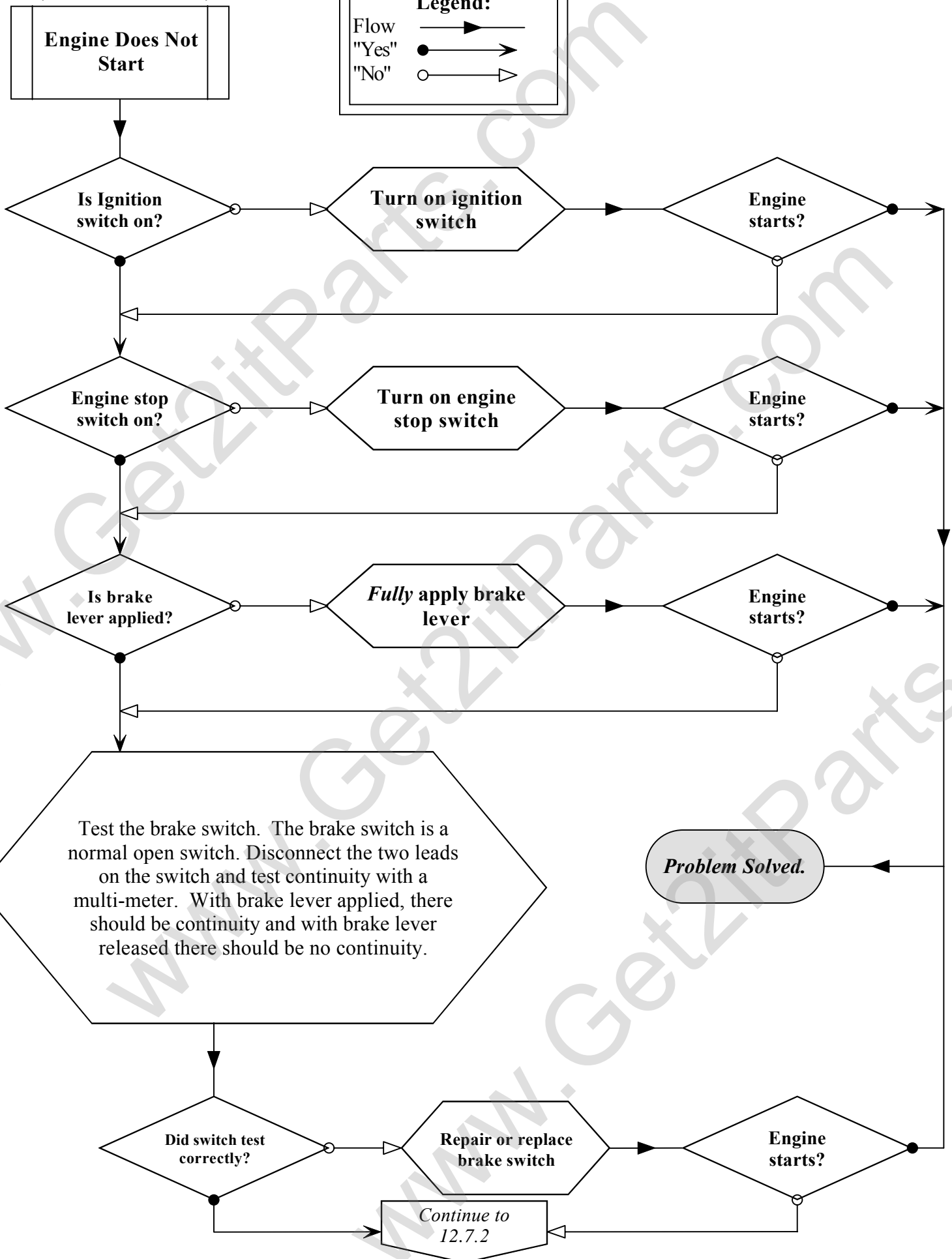
## TROUBLE SHOOTING





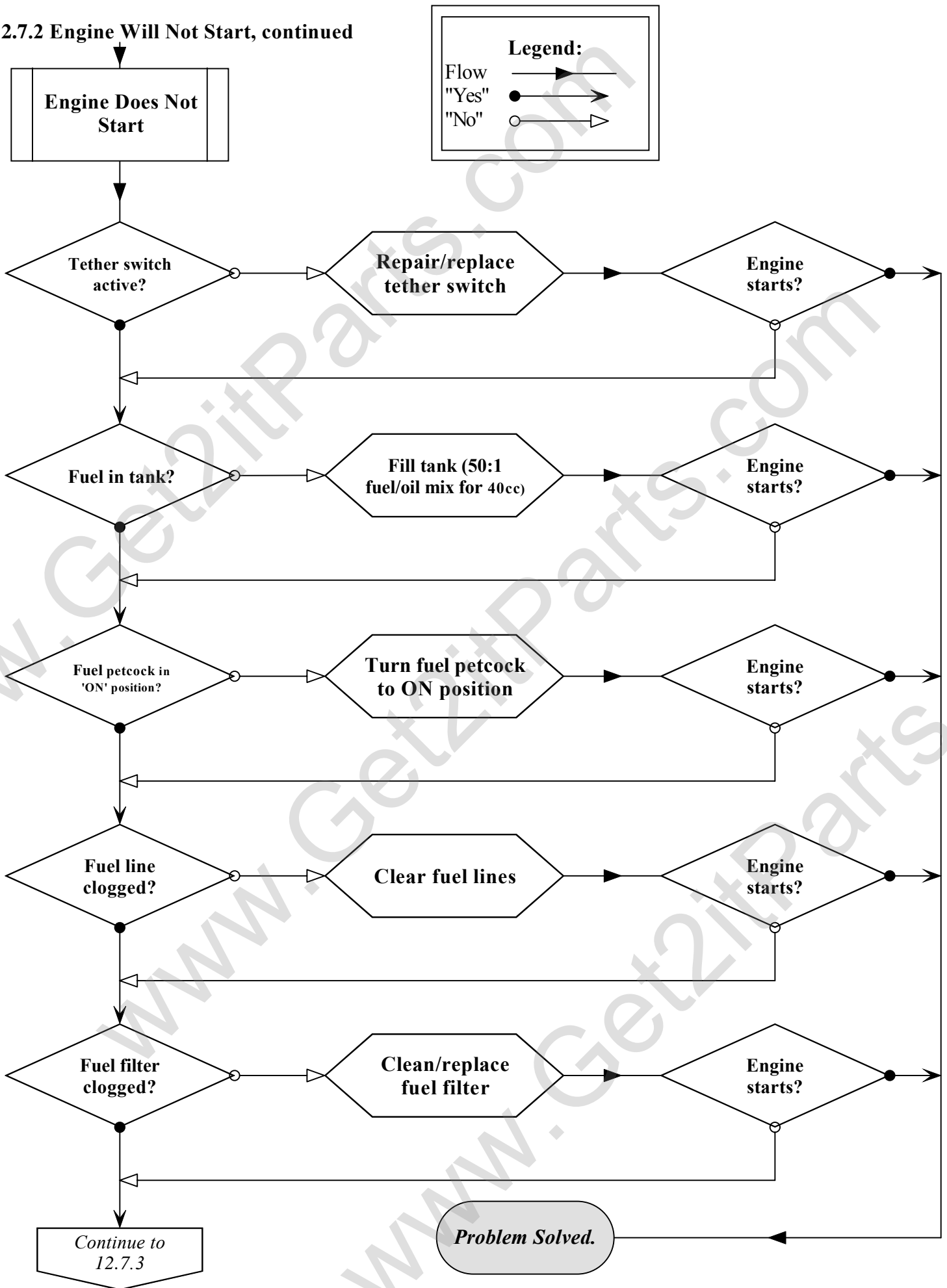


## 12.7 Engine Will Not Start (Start motor turns)

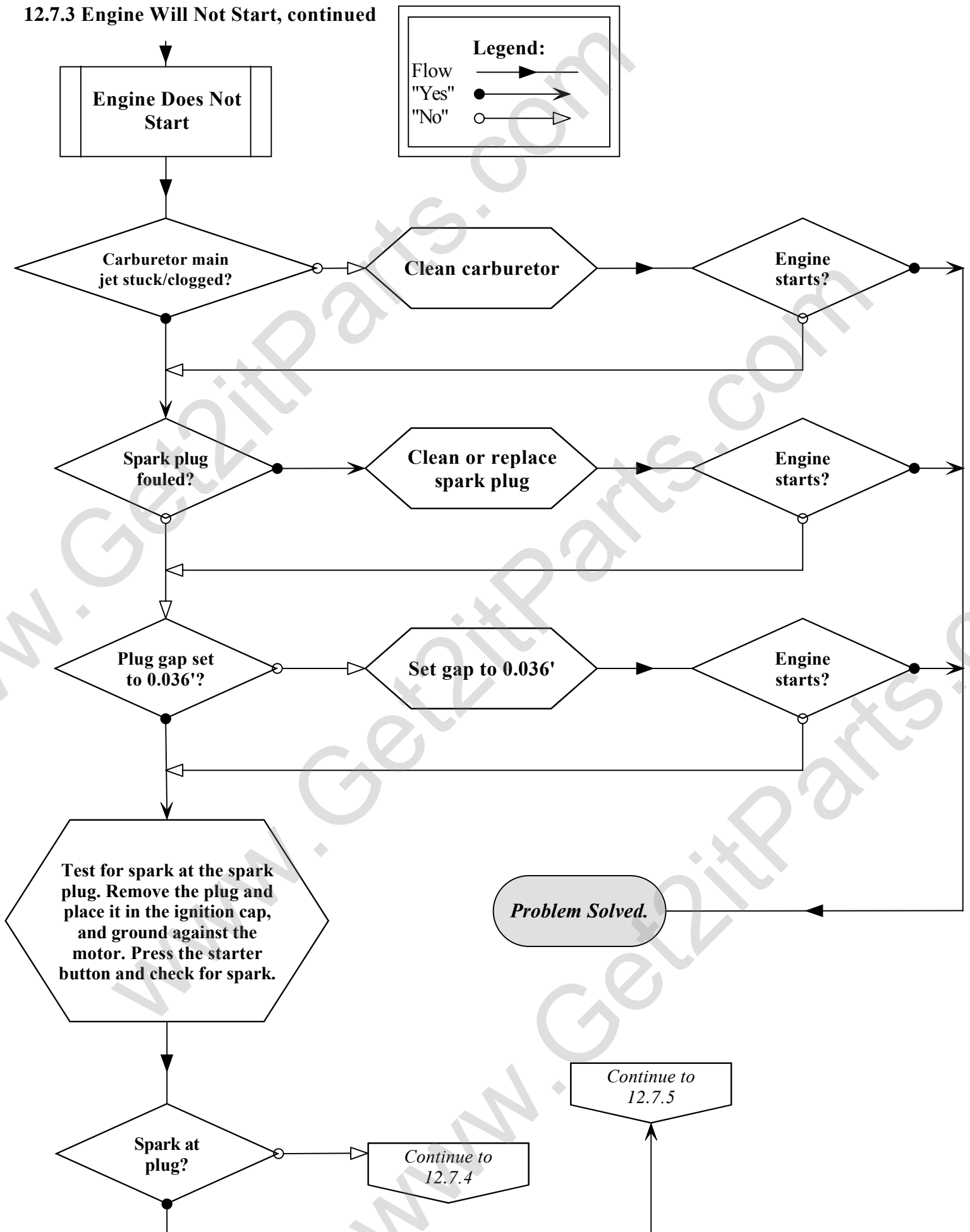




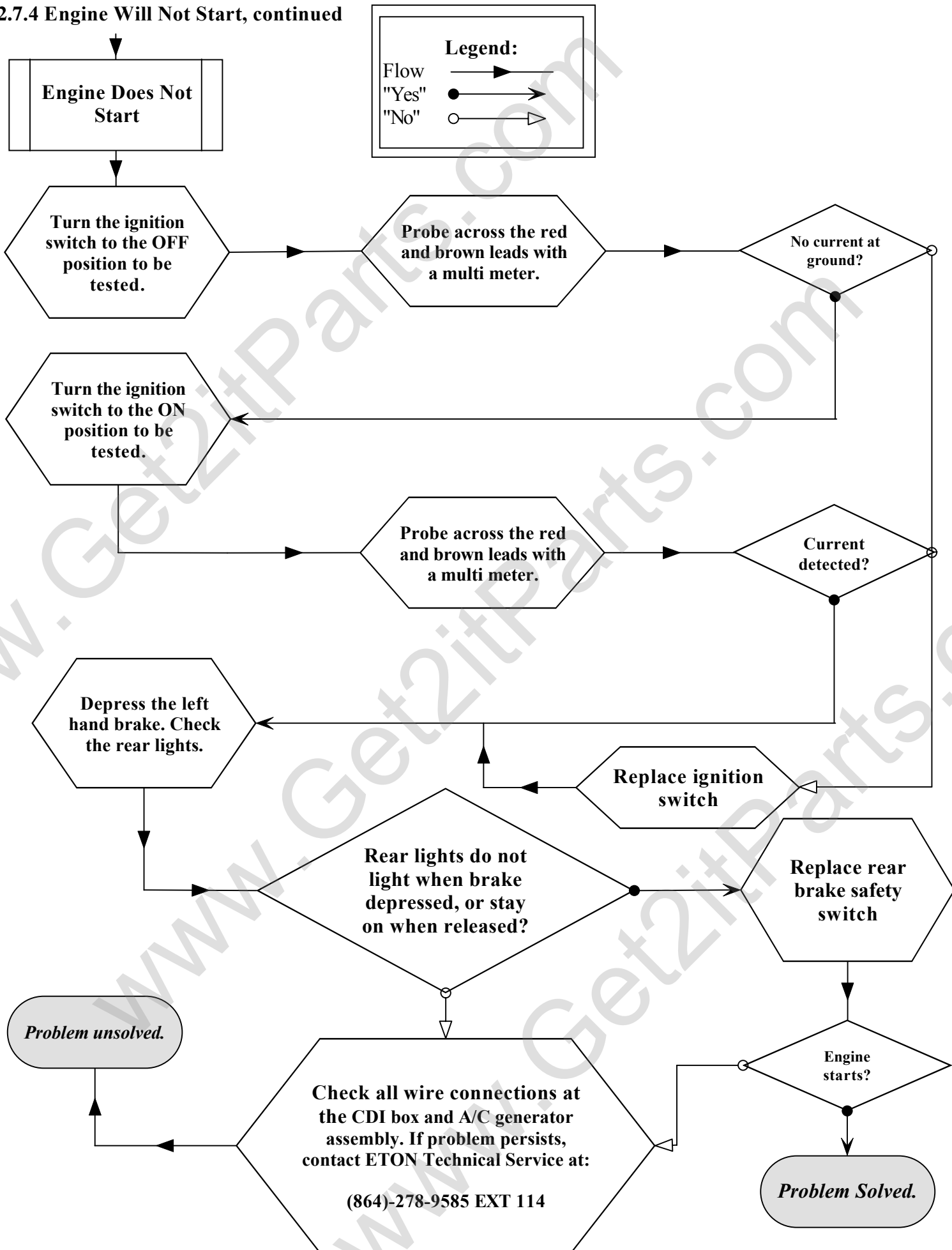
## 12.7.2 Engine Will Not Start, continued



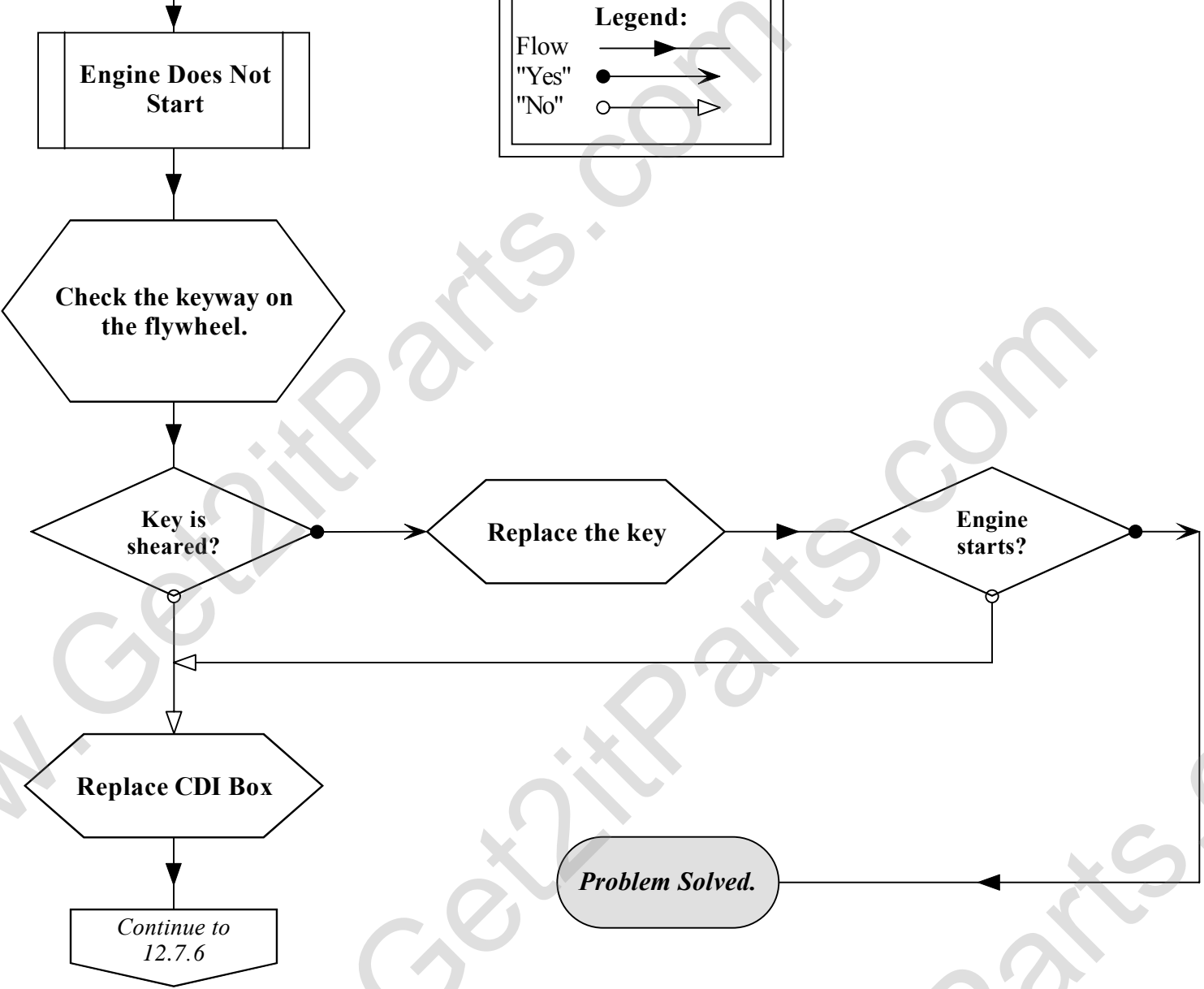
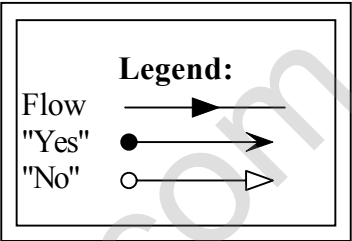
### 12.7.3 Engine Will Not Start, continued



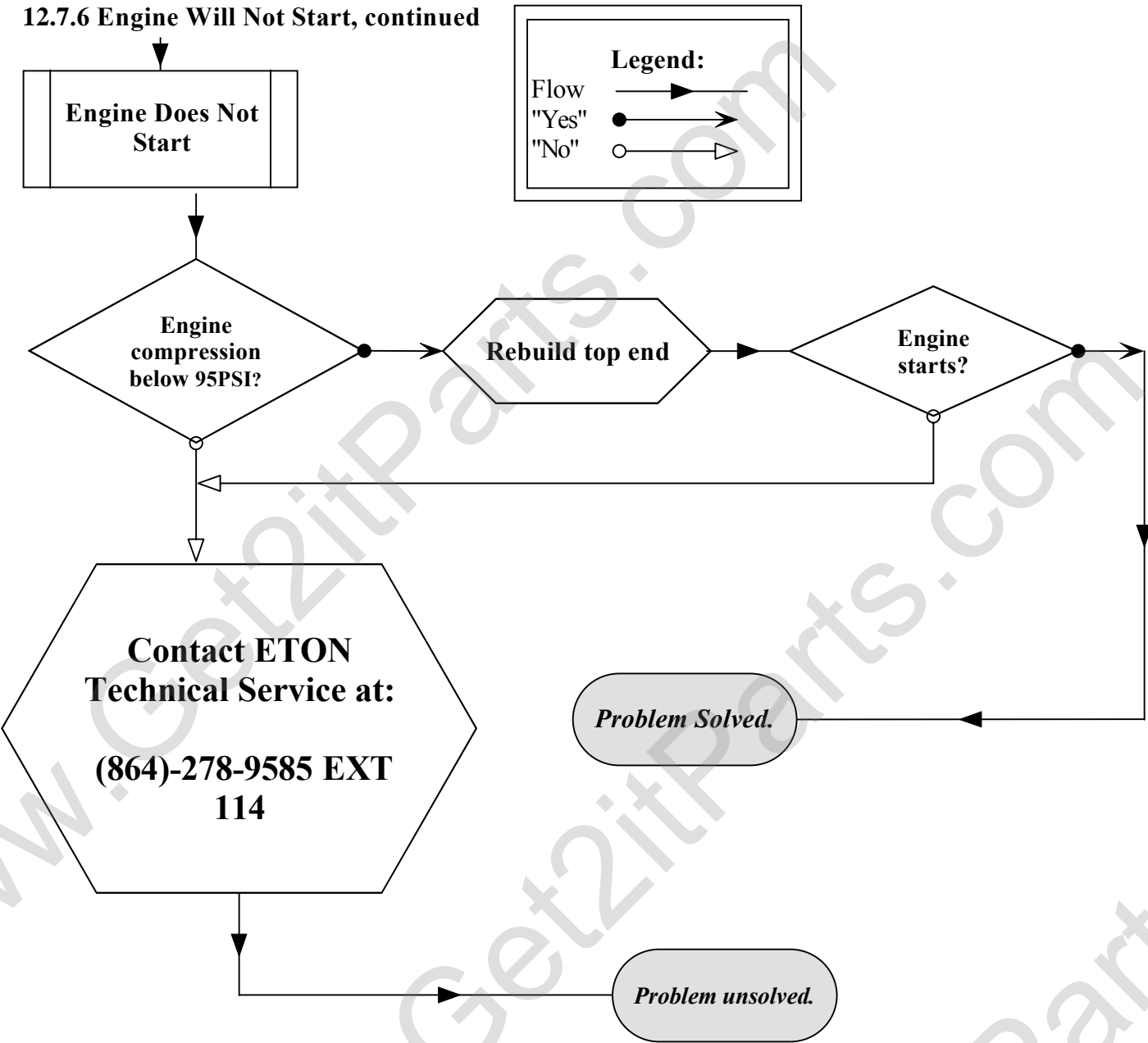
## 12.7.4 Engine Will Not Start, continued



12.7.5 Engine Will Not Start, continued



12.7.6 Engine Will Not Start, continued



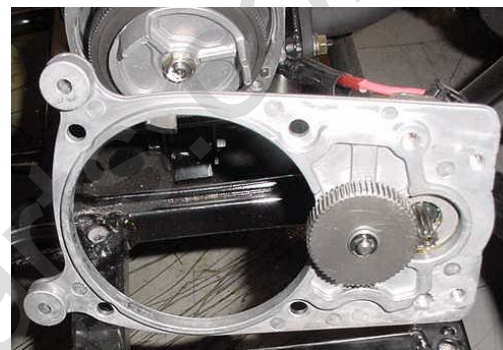


## 13.1 VIPER 40E ELECTRIC STARTER

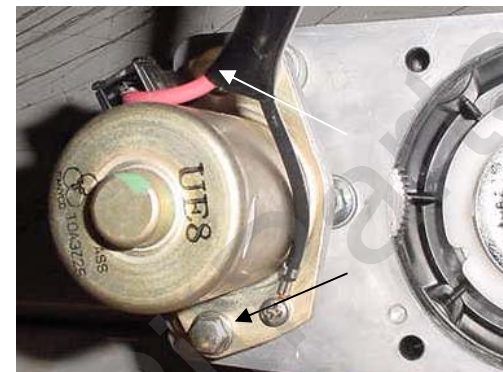
The Viper 40E is equipped with an electric starter as well as a backup pull starter. To gain access to the reduction gear and starter wheel, remove the six Phillips head screws (circled in the picture).



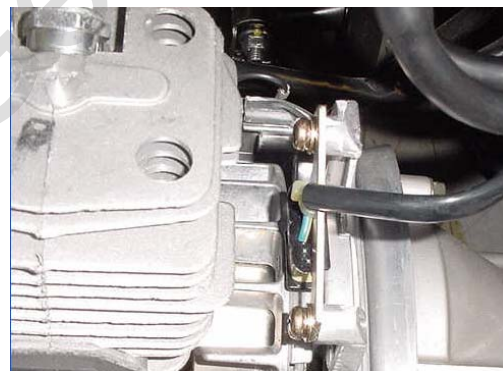
The reduction gear and starter wheel should be inspected and clean to prevent excessive noise in the starter system.



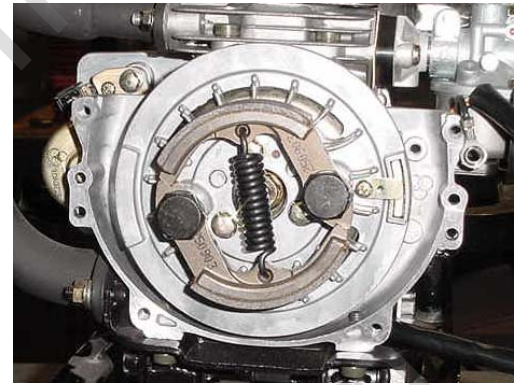
To gain access to the starter motor, remove the two 8mm bolts as shown in the picture. Cap can be removed from starter motor to gain access to the armature and the brushes. Clean and inspect before replacing the starter motor.



Ignition pickup for the RXL-40E is located on top of the flywheel as shown in the picture. To test, unplug and probe leads across pickup wires. Pull the pull cord or engage starter motor (flywheel must be turning to read voltage); meter should read 0.3 to 1.5V-AC.



To gain access to the AC Generator, remove the two bolts from the clutch shoes, then remove the center nut from the engine cooling fan to gain access to the flywheel.



Remove the flywheel. Clean and inspect.



The AC generator also should be cleaned and inspected as well as the charging coils. To test output voltage, motor must be started or turning. Voltage should be  $>12V$ .



Output voltage coming from the AC generator runs through the voltage regulator. The output should be the same ( $>12V$ ) but it should be **DC** voltage.





# ETON America, LLC



## Service Bulletin

Bulletin No: 0008  
Date: 08/25/2000

## Technical Tips

### 1. PAPER FUEL FILTERS -CAUSE: RESTRICTIVE FUEL FLOW

THEY CLOG EASIER

THEY WILL SHOW FUEL IN FILTER, BUT THERE WILL BE NO FUEL IN CARBURATER BOWL.

REPAIR: REPLACE WITH AN E-Z FLO WITH FILTER OR A STONE TYPE FILTER.

### 2. EXHAUST RESTRICTERS-CAUSE: LACK OF POWER

LOSS OF POWER

FOULED PLUGS

REPAIR: CLEAN RESTRICTER ONCE A MONTH OR REMOVE RESTRICTER AND USE THROTTLE STOP SCREW.

### 3. AIR FILTERS -----CAUSE: LACK / LOSS OF POWER

LEAN CONDITIONS

POOR THROTTLE RESPONSE

REPAIR: CLEAN AFTER EVERY 3-5 RIDES, MORE FREQUENTLY IN DUSTY CONDITIONS.

USE A GOOD QUALITY FOAM FILTER SPRAY.(BEL-RAY FOAM FILTER SPRAY)

### 4. BATTERIES----THE BATTERIES FOR ALL ETON VEHICLES ARE MAINTANCE-FREE .

#### PROPER SERVICE PROCEDURES ARE AS FOLLOWS:

1. FILL BATTERY WITH BATTERY PACK SUPPLIED.
2. REMOVE FUNNEL AND LET BATTERY STAND WITH CAP OFF FOR AT LEAST 1 HR.
3. ALL FLUID IN BATTERY SHOULD ABSORBED BY BATTERY PLATES BEFORE CAP IS INSTALLED.
4. BATTERY IS READY TO BE CAPPED WHEN ALL ELECTROLYTE IS ABSORBED. (YOU SHOULD BE ABLE TO TURN BATTERY UPSIDE DOWN AND NO FLUID COME OUT)
5. MEASURE BATTERY VOLTAGE ACROSS TERMINALS AND IT SHOULD BE ABOVE 12.8 VOLTS IF PLATES HAVE ABSORBED ALL ELECTROLYTE.
6. NEVER ADD WATER OR HYDRO-SULFURIC ACID TO BATTERY HYDRO-SULFURIC ACID WILL CAUSE A SERIOUS CHEMICAL REACTION AND COULD CAUSE HARM TO YOU AND WILL DAMAGE BATTERY. ADDING WATER WILL ALSO DAMAGE BATTERY.
7. IF CHARGING IS REQUIRED SLOW CHARGE @ 5 AMPS FOR 5 HRSAND FAST CHARGE @ 5 AMPS FOR 30 MIN.



# ETON America, LLC



## Service Bulletin

**Bulletin No:** 0014  
**Date:** 03/07/2001

**Rascal (IXL 40): CDI Speed Limiter Adjustment Procedure.**

### Rascal IXL 40 CDI Speed Limiter Adjustment Procedure

**Units affected:**

All IXL-40 models (Rascal).

**Reason for bulletin:**

CDI speed limiter adjustments.

**Repair:**

Adjusting CDI speed limiter as required

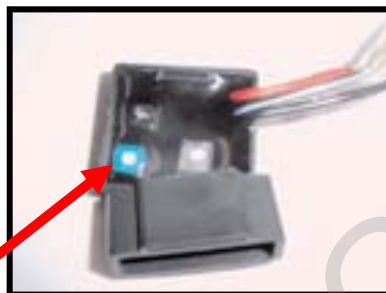
**Verify repair:**

Road test and verify ease of starting and proper speed range after speed limiter is adjusted.

### Rascal CDI Speed Limiter Adjustment

Adjusting the CDI speed limiter will also reduce plug fouling concerns and is a more efficient way to adjust speed for beginning riders. Adjust the CDI speed limiter to the desired speed and power and then adjust the throttle stop screw for restricting amount of throttle available. The following pictures show where the CDI speed limiter adjustment screw is located. Remove rubber cover for access to screw. Speed adjustment on the CDI is done by turning the white screw in the adjustment pod.

To **decrease** the speed turn the  
To **increase** the speed turn the



adjustment screw **clockwise**.  
adjustment screw **counter-clockwise**.





# ETON America, LLC



## Service Bulletin

<b>Bulletin No:</b>	<b>0017</b>
<b>Date:</b>	<b>03/07/2001</b>

### Rascal (IXL 40): Fuel/oil Mixture Ratio Update

#### Rascal IXL 40

#### Oil Mixture Update

#### Units affected:

All IXL-40 models (Rascal).

#### Reason for bulletin:

Update Fuel/oil mixture ratio

#### Repair:

Change fuel/oil mixture to 50:1

#### Verify repair:

Road test and verify ease of starting

#### Rascal IXL 40 Oil Mixture

After an extensive amount of research into the proper fuel/oil mixture for the Rascal IXL-40 we have determined the proper fuel/oil mixture ratio to be 50:1.

Our research showed that with today's oil technologies a mixture of 50:1 is perfectly acceptable and this change will reduce plug fouling concerns and aid in easier starts.

We recommend a high quality pre-mix oil such as BELL-RAY, Golden Spectro etc.

Rascal IXL-40 Fuel / Oil Ratio 50:1 2 1/2oz of oil per 1 gallon 89 Octane fuel





# ETON America, LLC



## Service Bulletin

**Bulletin No:** 0018  
**Date:** 05/15/2001

## Rascal No Spark Preliminary Check

ETON Technical department has recently received an increase in calls regarding Rascals (IXL-40) with no fire or will not start.

A high number of these calls have been traced back to a few simple problems.

1. Safety tether switch has been disengaged or connection wire unplugged.
2. Engine Stop switch has not been turn to the run position.
3. Fouled spark plugs, due to not switching to a 50:1 fuel/oil ratio as stated in Tech Bulletin #0017 and /or changing the plug type from Champion to NGK BPM7A.

We are asking our dealer and field sales force to have these item checked before placing a service call to ETON America's Warranty / Tech Services line.





# ETON America, LLC



## Service Bulletin

<b>Bulletin No:</b>	<b>0021</b>
<b>Date:</b>	<b>09/10/03</b>

### ATV Break-In Procedure

Your ATV requires a break-in period just as with all other internal combustion engines. This period allows the engine parts to seat and wear properly without undue strain which can cause premature failure.

1. For the first two weeks of operation do not run your ATV at full throttle for extended periods of time.
2. Viper 50M/50/70/90/90R  
Your first tank of fuel should be a pre-mixture of fuel and oil at a 50:1 ratio. This will insure that the oil pump system has been primed and bled of air that may have occurred in shipping.
3. Viper Jr.  
All fuel should be a pre-mixture of fuel and oil at a 50:1 ratio.
4. Do not operate the unit at more than 85% of maximum speed.
5. Do not over rev the engine.
6. Use light braking pressure to allow the brake pads to seat to the rotor and drums.





# ETON America, LLC



## Service Bulletin

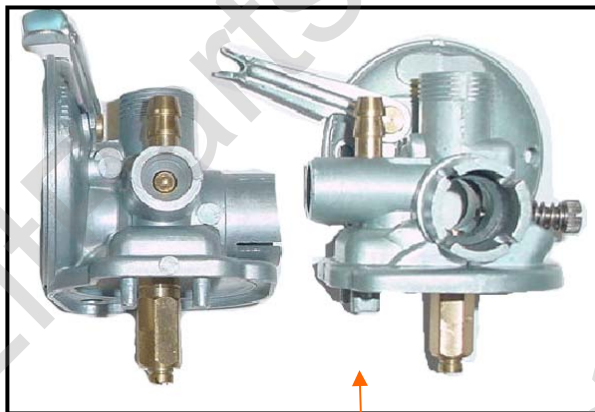
Bulletin No: **0024**  
Date: **04/01/2004**

### Rascal (IXL-40) & Viper Jr. (RXL-40) Carburetor Kits

There are two different carburetors for the Rascal (IXL-40) and the Viper Jr. (RXL-40). The different carburetors can be distinguished by the position and type of the fuel inlet tube. (see photo below) The only differences in the carburetor kits are the needle and seat assembly. See pictures below to select the correct kit.



If your carburetor looks like  
this use part # **810463**

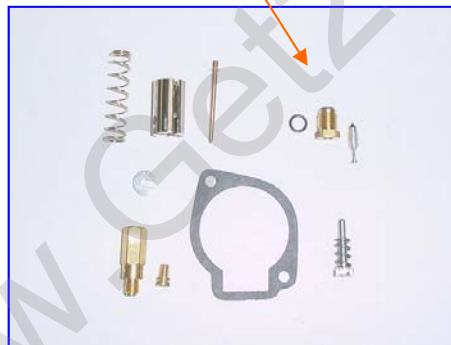


If your carburetor looks like  
this use part # **811276**

**Kit 810463** Needle and  
seat assembly



**Kit 811276** Needle and  
seat assembly







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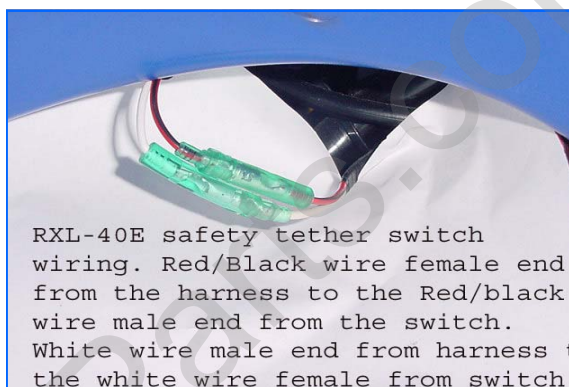
## Service Bulletin

Bulletin No: 0031

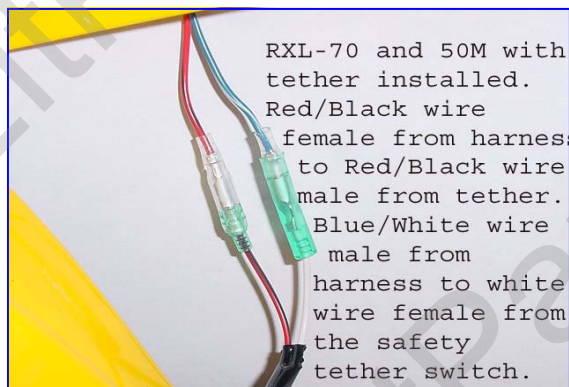
Date: 07/20/04

## Safety Tether Switch Installation

Install the tether switch on the LH side of the handlebars and shown in the picture. Tighten to the handlebars with the 4 bolts supplied with the switch. Start the bike and lock the parking brake. Pull the rubber cap from the switch and the bike should stop. If it doesn't check the connections for your bike as shown in the pictures.



RXL-90R safety switch wiring. White/Black wire female from harness to Red/Black wire male from the switch. Brown/Yellow wire male from the harness to the White wire female from the switch.



Switch color codes	40E	50M	70	90R
Red/Black male	Red/Black Female	Red/ Black Female	Red/ Black Female	White/ Black Female
White wire female	White wire Male	Blue/ White Male	Blue/ White Male	Brown/Yel Male



# ETON America, LLC



## Service Bulletin

Bulletin No: 0032

Date: 07/23/2004

## 2005 Viper Models No Power

Viper models with no power or bad throttle response. Remove the 4mm spark arrestor retainer bolt as shown in figure 2. Then remove the spark arrestor with a pair of needle nose pliers (figure 3). Then clean the screen or replace the element part # 811008.

Symptoms of a dirty spark arrestor.

1. Loss of power or no power
2. Bad throttle response
3. No start situation



Figure 1



Figure 2



Figure 3



Figure 4





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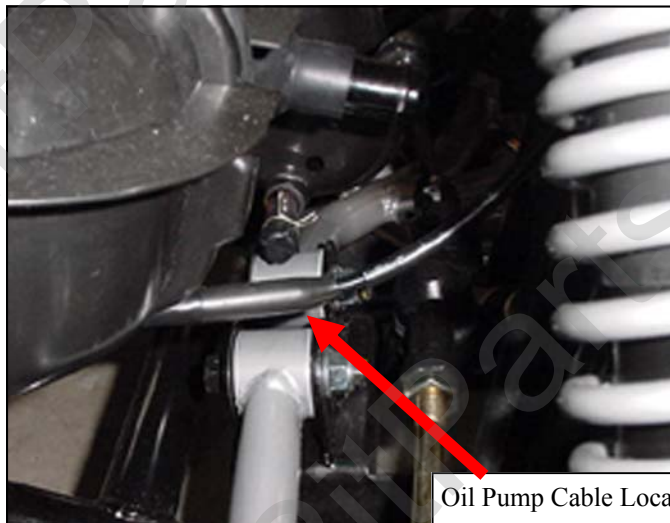


## Service Bulletin

Bulletin No: 0033  
Date: 04/01/2004

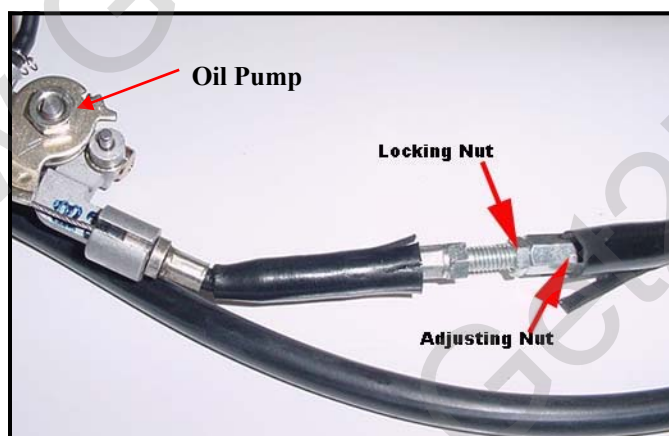
### Oil Pump Flow Adjustment all Oil Injected two cycle Engines

To adjust the oil pump flow on a two cycle oil injected engine you must adjust the oil pump cable length. . The Oil pump cable is located on the right hand side of the engine just above the (RH) A-arm



Oil Pump Cable Location

To reduce the oil flow you must lengthen the cable by loosening the lock nut and turning the adjusting nut counter clockwise then retighten the locking nut. To increase the oil flow you would shorten the cable by turning the adjusting nut clockwise.





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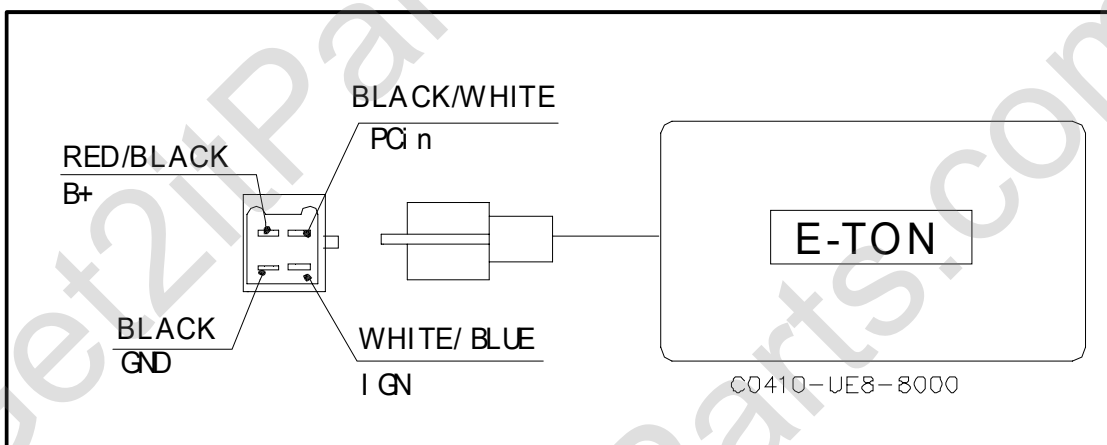


## Service Bulletin

Bulletin No.: **SB-0042**

Date: 05/01/2006

### C.D.I. Module Specifications Viper 40E (2 Cyle)



#### RXL-40E -- C0410-UE8-0000

##### Electric resistance( $\Omega$ ) specification

	ACC	Pcin	IGN	GND	EXT	KS
ACC		200-500K	$\infty$	10-20K	20-40K	500K-1M
Pcin	30K- $\infty$		$\infty$	50-70	80-100K	500K-1M
IGN	30K- $\infty$	80-100K		1-3K	5-7K	100-300K
GND	<b>30K-<math>\infty</math></b>	<b>60-70K</b>	$\infty$		<b>1-3K</b>	<b>100-300K</b>
EXT	$\infty$	300-500K	$\infty$	100-200K		100-200K
KS	$\infty$	$\infty$	$\infty$	$\infty$	$\infty$	

Specifications highlighted in yellow are the suggested critical testing points. Test points should be tested first.

We suggest using analogy type multi-meter to test the electric resistance. We have found using digital type meter produces to many inaccurate readings.

